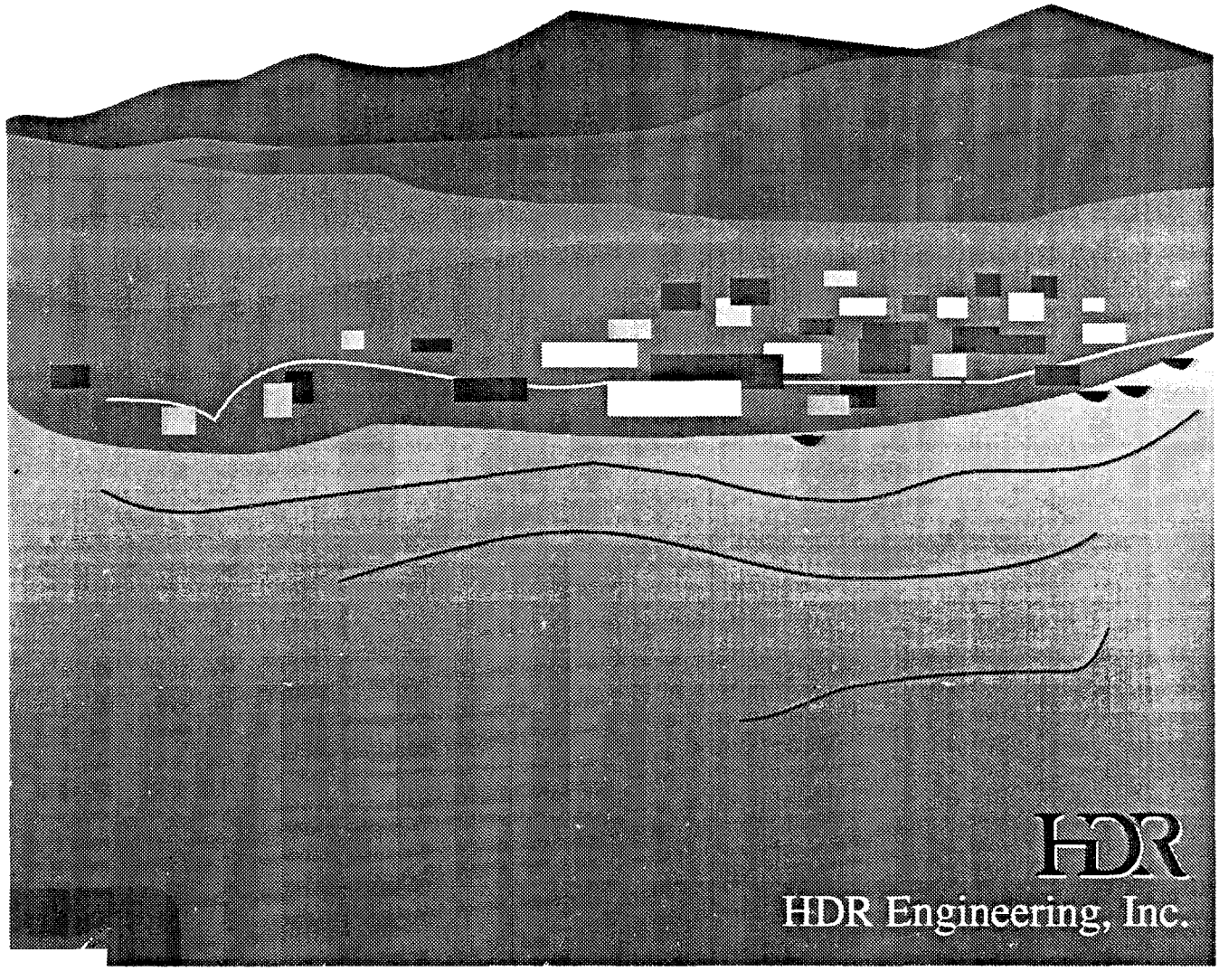
Office of the Governor
Division of Governmental Coordination

Cumulative Impacts in Alaska

Where They Occur and How Agencies and Districts Address Them

Final Report



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Where They Occur and How Agencies and Coastal Districts Address Them

Final Report

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Executive Summary

As Alaska grows, increased activity to support its population causes impacts to environmental, economic, social, and cultural resources. While these impacts are more geographically dispersed than in other states, they are adding up over time resulting in reduced resource values. As with many parts of the country, these cumulative impacts are most pronounced in the coastal regions of the state where the majority of population and activity exists.

The overall goal of the Cumulative Impacts in Alaska project is to define and characterize the problem of cumulative impacts statewide, so that any program changes made in the future are based on a solid understanding of what needs to be "solved." Designed to serve as an independent assessment of cumulative impacts in Alaska, this project focuses on three main areas of inquiry, namely, (1) identifying where in Alaska significant cumulative impacts are occurring; (2) describing how state agencies and local coastal districts currently address cumulative impacts; and (3) evaluating the overall effectiveness of these practices and providing suggestions on how they can be improved. This report's findings are based on information gathered during a telephone survey of resource management practitioners statewide.

Eighty-five people were identified to participate in this telephone survey including 52 representatives from state agency divisions that deal with cumulative impacts, and a contact from each of the 33 coastal districts. The goal was to select a sample that represented a cross section of the practitioners who work with the Alaska Coastal Management Program or with resources in the coastal zone. Of these 85 people, 70 participated in the telephone survey. Each of these 70 people responded to survey questions regarding the locations of and current practices used to address cumulative impacts.

Once the interviews were completed, both qualitative and quantitative assessments of the survey results were conducted. In conjunction with design of the survey, evaluation criteria were developed to determine the success of the respondents' methods for addressing cumulative impacts. By analyzing survey results and applying these criteria, an overall evaluation of the effectiveness of current practices was developed.

More than 175 individual geographic sites were identified by respondents as having experienced cumulative impacts. This total does not include respondents' comments such as "95% of all the small villages in the state have cumulative impacts from inadequate waste disposal and water systems." The cumulative impacts are varied and widespread. They incur costs for communities and reductions in the quality of resources those communities depend upon.

The study found that current practices are inadequate for identifying, considering, and controlling cumulative impacts in Alaska. Basically, there is no concerted statewide effort

to address cumulative impacts. In general, respondents have the experience and ability to address cumulative impacts, but many obstacles exist and very few formal steps or methodologies are consistently applied to address cumulative impacts. Success occurs in isolated cases where the components necessary for success are in place.

The obstacles identified by respondents include: a lack of a commitment from top-level officials; unclear mandates and directives; uncertainty about the definition of cumulative impacts; insufficient resources such as staff time and funding; a lack of guidance, tools, standards or thresholds for practitioners to apply; a lack of training and experience in smaller coastal districts particularly; lack of public understanding about cumulative impact problems and how they can be addressed; inadequate information sources; and political pressure against addressing cumulative impacts.

Based on analysis of the survey findings and suggestions from survey respondents, the report concludes that there is a need for improving how cumulative impacts are addressed in Alaska. The following recommendations are presented.

- Establish a top-level commitment to address cumulative impacts in Alaska, supported by practitioners and the public statewide.
- Pursue more explicit authority to address cumulative impacts in legislation, regulations, or policy.
- Develop more formalized cumulative impact assessment guidance to be used by agencies and coastal districts based on existing statutory authorities.
- Establish a cumulative impact definition in regulation.
- Provide training for those responsible for cumulative impact assessment, particularly for small coastal districts to assist them in identifying, considering, and controlling cumulative impacts.
- Provide adequate resources (including funding and devoted staff time).
- Develop a public education program.
- Develop better sources of information and information sharing among agencies.

The findings and recommendations in this report form a framework for addressing cumulative impacts statewide. Until action is taken on these recommendations, steps to address cumulative impacts are likely to continue as they are now, largely informal, ad hoc and rarely effective.

1.0 Introduction

When the Alaska Coastal Management Program was established by the Alaska Legislature in 1977, cumulative impacts in state resource management were not the focal issue they are today. The cumulative effects of multiple uses in particular coastal regions over time seemed a pressing issue only for the lower 48 states, and perhaps for Alaska some time in the future. But as coastal populations and coastal uses have increased, resource managers statewide have had to face this difficult issue. Several court cases in recent years have also escalated cumulative impacts into a critical legal issue.

The Alaska Coastal Management Act calls for consideration of cumulative impacts, but with no clear direction as to how the state should do so. This issue gained recognition in coastal states nationwide during the 1980s. In 1990, the reauthorization of the federal Coastal Zone Management Act made cumulative impacts into a national priority with funding available through Section 309 of the Act for states to address this complex problem. This project, funded by Section 309 money, comprises one part of the state's process in determining its policy direction.

1.1 Purpose

The overall goal of the Cumulative Impacts in Alaska project is to define and characterize the problem of cumulative impacts statewide so that any program changes made in the future are based on a solid understanding of what needs to be "solved." The results of this project should lay the foundation for future measures. The Division of Governmental Coordination (DCG) is conducting an assessment of federal methods used in identifying and addressing cumulative impacts. The next step in Alaska's cumulative impacts strategy is to convene discussion groups to develop broader recognition of the problems and potential solutions.

1.2 Scope

To provide useful baseline information, the scope of work for this project focuses on three main areas of inquiry.

- Identifying where in Alaska significant cumulative impacts are occurring, or are likely to occur in the future.
- Describing how state agencies and local coastal district currently address cumulative impacts and the direction they have to do so.
- Evaluating the overall effectiveness of these practices and providing suggestions on how they can be improved.

This project's methodology consists of gathering information through telephone interviews. A research methodology consisting of interviews with state and local planners and resource managers has several advantages and disadvantages. Most importantly, the research provides a collective picture of individual interpretations of cumulative impact problems from a selected sample of practitioners within and related to the Alaska Coastal Management Program (ACMP). This collective picture provides a snapshot of the problem and the current practices for addressing cumulative impacts. The most important feature is that the information gathered comes directly from those with current roles ("the experts") in identifying and addressing cumulative impacts in Alaska. These respondents were selected to represent a diverse group of perspectives and include planners, field personnel, scientific researchers, permitters, and administrators from across the state. More detailed information on the methodology of this report is contained in Chapter 3.0.

The methodology does, however, have some limitations. For example it will not result in a comprehensive list of geographic sites, but rather will identify primary sites of cumulative impacts. Moreover, the project scope did not include reaching the many others who have worked with cumulative impact problems in Alaska, such as attorneys, outside consultants, or private permit applicants. The methodology does not provide for independent field verification of the sites mentioned to find out the degree to which cumulative impacts are occurring or if methods to address the impacts are actually working. Thus, the success of current practices is evaluated based on secondary information. The information is, however, from the professional practitioners who are the experts in addressing cumulative impacts under Coastal Zone Management in Alaska. Finally, the scope of this report is to examine how cumulative impacts are addressed in Alaska, particularly through the Alaska Coastal Management Program (ACMP). The report does not, however, attempt to characterize implementation problems with the ACMP overall and how the more general problems with the ACMP could be addressed. These issues are discussed in a Department of Natural Resources report referenced in Section 2.4.

1.3 Organization of this Report

The first chapter of this report provides a brief introduction to the project and describes the project's purpose and scope. ***Chapter 2.0*** provides a project history, a definition of cumulative impacts, and a brief review of cumulative impacts in relation to the Alaska Coastal Management Program. ***Chapter 3.0*** explains the methodology used to gather and analyze information. It specifically explains who was interviewed, how they were selected, and describes the criteria and methods used to analyze the information provided by respondents. ***Chapter 4.0*** describes the survey findings and evaluates the success of the methods used. ***Chapter 5.0*** presents recommendations based upon the findings in chapter 4.0 and includes suggestions for further study. ***Chapter 6.0*** provides the conclusions of the report.

2.0 Background

2.1 Project History

Alaska's strategy for addressing cumulative impacts to coastal resources as part of its section 309 assessment has been underway for three years. Federal funding, authorized under Section 309 of the 1990 reauthorization of the Coastal Zone Management Act, is being used to fund research on four issues important to Alaska, of which, control of cumulative and secondary impacts is one. Several projects in addition to this report have been completed. In 1993 the Division of Governmental Coordination completed a study entitled "Regulation of Cumulative and Secondary Impacts in Alaska." Several other agency reports on cumulative impacts were also completed in Alaska during 1993 and 1994, each with varying assessments of the issue. A detailed technical field study has been completed on the cumulative impacts to one coastal resource, the main stem of the Kenai River. The Kenai Peninsula Borough coastal district drew on this study to develop local support for new cumulative impacts policies. A brief summary of these Section 309 Assessment projects is included in Section 2.4.

Work done to date has gone a long way toward defining the problem, identifying what has been done in other states, identifying what statutory and regulatory authorities pertain in Alaska, determining some current practices in Alaska for addressing cumulative impacts, and cataloguing the shortcomings of current practices in protecting coastal resources. State agency discussions surrounding the implementation of regulations, however, indicated that there was no consensus about the extent of cumulative impacts in Alaska and little information about where impacts occur or how state agencies and coastal districts address them.

To help research and clarify the issue, an intergovernmental management team was formed and tasked with overseeing a research effort to further study the issue. The management team was composed of individuals from the Alaska Department of Natural Resources; the Alaska Department of Fish and Game; the Alaska Department of Environmental Conservation; the Alaska Department of Commerce and Economic Development; the Office of the Governor - Division of Governmental Coordination; the Kodiak Island Borough Coastal District; and the Bristol Bay Coastal Resource Service Area coastal district. HDR's Environmental Services Division in Anchorage was selected as the consultant to conduct the research and prepare this report.

The management team decided that a phone interviews should be used as the research method. The team identified 85 potential respondents including 51 representatives from state agency divisions that deal with cumulative impacts and a contact from each of the 34 coastal districts. In short, the intent of the project is to characterize the problem of cumulative impacts statewide by surveying a broad cross-section of individual agency and coastal district practitioners regarding sites impacted by cumulative effects and current practices used to address these impacts. A survey was developed and pretested in early

1995 and interviews were conducted in March and April. This report summarizes the findings of the interviews and provides recommendations on addressing cumulative impacts in Alaska.

This project is important because of Alaska's unique opportunity to be proactive in the management of its coastal resources. Whereas other states are struggling to restore their coastal resources from decades of cumulative impacts, Alaska has an opportunity to preserve its coastal resources before cumulative impacts become difficult and expensive to reverse.

2.2 Cumulative Impacts Defined

Cumulative impacts are defined in federal regulation, not in the federal Coastal Zone Management Act, but in the Council on Environmental Quality's (CEQ) regulations. These regulations guide environmental impact assessment required by the National Environmental Policy Act. Found in 40 CFR Part 1508.7, the regulations state:

> Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The "general concept" of a cumulative impact used in this study is largely based on this definition but was modified slightly to be more loosely defined and understandable. The general concept was read to each of the respondents after asking them what the term meant to them. It was deemed important to provide each of the respondents with a definition so that all respondents would have a consistent point of reference with which to answer the interview questions. The concept used in this study and read to all respondents is as follows:

> A cumulative impact is the effect of an action when added to the effect of other past, present, and reasonably foreseeable future actions, regardless of who undertakes the various actions. A cumulative impact can result from individually minor but collectively significant actions taking place over time. In other words, several minor effects add together to cause a more severe impact. A cumulative impact can be environmental, economic, social, or cultural in nature. The impact can be from a single source or from multiple sources added together or added together over time. For this survey, cumulative impacts are presumed to be adverse effects.

Two assumptions should be noted here. First, the assumption that cumulative impacts are adverse is rooted in HDR's interpretation of the CEQ definition and the literature on cumulative impacts. The general implication is that cumulative impacts need to be assessed to determine whether they constitute a significant adverse effect. The management team and the consultant recognize that some cumulative impacts (such as economic developments) are viewed as having beneficial cumulative impacts. To prevent potential confusion in the analysis of results, we asked respondents to speak about *adverse* cumulative impacts.

Second, it was decided that the interviews would not address secondary impacts except where secondary impacts persist over time or are additive with other impacts, in which case they become cumulative. The team recognized secondary impacts as an important part of the overall spectrum of impacts to coastal resources, but decided to focus this study on cumulative impacts. Thus, secondary impacts are addressed in the report only where they are cumulative as well.

2.3 The ACMP and Cumulative Impacts

The Alaska Coastal Management Program was established in 1977 by the Alaska Legislature which signed into law the Alaska Coastal Management Act (AS 46.40). This act, which was amended in 1994, provides the legislation for implementing the federal Coastal Zone Management Act of 1972. The intent of the Alaska's program is essentially six-fold and summarized here from the legislative policy which accompanies the act. It is state policy to: (1) preserve, protect, develop, use, and where necessary, restore of enhance coastal resources; (2) encourage coordinated planning and decision making in the coastal area; (3) develop a management program to guide and resolve conflicts involving the use of coastal resources; (4) ensure participation of the public and various levels of government in the program; (5) use existing governmental authority and structure in achieving the legislative policies, and (6) authorize and require state agencies to carry out their duties and responsibilities in accordance with the program.

To implement the program, state regulations (6 AAC 50 & 6 AAC 80) have been adopted. These regulations describe how the state reviews projects for consistency with the program, provide state standards for the review of coastal development, and set out guidelines for the development and amendment of local coastal management programs. The role that cumulative impacts play in the program is mentioned in statute and in regulation.

The term "cumulative impacts" is explicitly and implicitly referred to in several ACMP statutes, regulations, and enforceable policies. The most thorough analysis of the legislation regarding cumulative impacts is found the 1993 report titled "Regulation of Cumulative and Secondary Impacts in Alaska" (Glenn Gray, DGC, 1993). According to that document, the legislative intent and codified language of the Alaska Coastal Management Act implicitly provides direction to consider cumulative impacts. The

direction is most specific in the definition of "use of direct and significant impact," found in AS 46.40.210, which states in part:

> Use of direct and significant impact means a use, or activity associated with the use, which proximately contributes to a material change or alteration in the natural or social characteristics of a part of the state's coastal area and in which...the use would, of itself, constitute a tolerable change or alteration of the resources within the coastal area but which, cumulatively, would have an adverse effect [emphasis added].

In addition, the consistency review notice process requires consideration of cumulative impacts by the coordinating agency. Specifically 6 AAC 50.070(f) states:

> In evaluating the need for public notice of a project, the coordinating agency shall consider the magnitude of likely impacts, including cumulative impacts on the affected area.

Finally, the DGC report identifies that nine coastal district plans specifically have enforceable policies relating to cumulative impacts and a number other plans implicitly require cumulative impacts to be considered based on the term "use of direct and significant impact." There are, however, still many questions about what is and is not legally required regarding cumulative impacts.

2.4 Cumulative Impact Assessment in Alaska

This section provides a brief annotated bibliography on recently completed cumulative impact studies in Alaska. These projects were funded under the State of Alaska's Section 309 assessment. This section is intended to provide background for this report by highlighting research that has been conducted in the last three years. (It does not include the many environmental impact statements and other legal documents which may have addressed cumulative impacts in Alaska in recent years.)

Regulation of Cumulative and Secondary Impacts in Alaska. This report by the DGC (1993) documents the findings of a research project on the regulation of cumulative and secondary impacts in Alaska. The purpose of this project was to evaluate existing provisions in Alaska and other states regarding cumulative and secondary impacts to make recommendations on changes to the ACMP program.

Cumulative and Secondary Impacts and the Alaska Coastal Management Program. This report was prepared by the Southcentral Regional Office of the Alaska Department of Natural Resources' Division of Lands (DNR) (1994). It was based on field work on the Kenai Peninsula and elsewhere, and discussions with staff responsible for permitting, monitoring, and enforcement work in the field. It establishes a framework for addressing cumulative and secondary impacts. It also discusses the DNR's perspective on what must

be in place for progress to be made on controlling cumulative and secondary impacts in the ACMP.

Kenai River Fish Habitat Cumulative Impacts Project. This report was prepared by Jon Isaacs and Associates, Resource Analysts, Louisa Moore, and Nancy Wainwright (1994) to develop coastal management policies for incorporation into the Kenai Peninsula Borough's coastal management program. Developed through a series of facilitated public and working group meetings, recommendations and coastal management program revisions were recommended.

An Assessment of the Cumulative Impacts of Development and Human Uses on Fish Habitat in the Kenai River. This technical report prepared by the Alaska Department of Fish and Game (ADF&G) (1994) was designed to identify and evaluate the cumulative impacts of development actions on Kenai River fish habitat. The U.S. Fish and Wildlife Service (USFWS) Habitat Evaluation Procedures process was used for analyzing the impacts. Field data was collected, mapped, and analyzed to assess the impacts on rearing habitat of juvenile chinook salmon. (The importance of this study was to quantify habitat units to provide an indication of the cumulative impact on the river, and to provide a basis for managing effects of future developments.)

Nonregulatory Mechanisms for Habitat Protection. This ADF&G report (1993) provides an evaluation of nonregulatory mechanisms for assessment and control of cumulative impacts of coastal uses on fish habitat along the Kenai River. The nonregulatory approach encourages landowner participation in the conservation and protection of natural resources through education and positive incentives that increase the attractiveness of conservation activities.

3.0 Methodology

3.1 Survey Method

Telephone interviews were the method used to gather data for this project. This method was chosen for several reasons. First, because of Alaska's size and time and money constraints, it was clearly impractical to conduct in-person interviews with all respondents. Second, the physical presence of an interviewer can often affect some respondents' thinking. Telephone contact, however, reduces the contact to one of voice only.

A written questionnaire was not chosen because of the advantages of the telephone interview process. First, it was determined that interviewing would result in more in-depth answers. In a written questionnaire, respondents often skip open-ended questions, or leave cryptic, vague answers. During an interview process the interviewer is able to interact with the respondent to clarify responses, and this results in more complete responses to complex issues. Another advantage of interviews is the opportunity to pre-schedule time with respondents and ensure a higher percentage of completed surveys, compared with the comparatively low percentage of returns associated with mailed out, written questionnaires. For these reasons, telephone interviews were selected as the most appropriate method to reach all respondents across the state.

A survey was designed to facilitate interview interactions, record keeping, and documentation of responses. A copy of the survey is located in Appendix C. The survey questions were designed to be neutral to avoid leading respondent toward a particular answer or presenting any bias. The approach to the survey design followed a "funneling" methodology. Generally each topic of inquiry starts with one or more open-ended questions and is followed up by a closed question which requires the respondent to respond to a predetermined list of items. The philosophy behind this approach is that asking the open-ended question first allows for the respondent's open, unbiased response. Subsequently, specific answers to the predetermined list are sought.

The final survey included 15 questions in four parts.

- The respondent's concept of cumulative impacts and authorities or sources of direction, if any, that they used for addressing cumulative impacts.
- Sites in the respondent's area where cumulative impacts have occurred.
- Steps or methods used to identify, consider, and control cumulative impacts.
- Closing information from the respondent (their related work experience and any recommendations).

It is useful to acknowledge several limitations to this survey. First, the survey acted as a mechanism for collecting and evaluating information reported by respondents. In other words, this project's findings are based on experts' interpretations of current situations and practices. Second, this method incorporates no work to independently evaluate

success of the methods in the field which have been used to address cumulative impacts. While one respondent may report that a given process is successful, another may report that it is not successful. No independent field verification of that success is incorporated into this project scope. For this reason, much of the evaluation is "process oriented," that is, it is assumed that if the process is effective outcomes will also be effective. There are, however, questions in the survey designed to determine whether the techniques and methods used have resulted in successful outcomes. These questions, however, still rely on the expert opinion of those interviewed. Third, respondents reported their experience according to survey questions asked. While all respondents were asked all questions directly from the survey, responses in part depend on the follow-up questions asked. Therefore, in some cases respondents may have reported more or different information depending on follow-up questions asked. Prompting and follow-up questions are used in an interview process to elicit more complete and accurate information. The ability of the interviewer to read the respondents to ensure understanding of the question and obtain complete responses to all questions is the main advantage to interviewing over a mail-out written survey. It can, however, cause slightly different interpretations among the respondents where the interview deviates from the written questions. These types of limitations are prevalent in many types of survey methodologies and should be acknowledged.

3.2 Survey Sample

The objective of designing the survey sample was to establish a respondent pool that was representative of a cross section of the practitioners that work in ACMP-related functions or with resources in the coastal zone. The management team had the responsibility of selecting the respondent pool. Each agency representative on the management team selected the respondents for their agency. The criteria used to select respondents addressed a need for a broad representation:

- geographically across Alaska,
- from the various program areas within each agency, and
- among the types of responsibilities within each agency, such as field work, policy-making, permitting, planning, and so on.

Approximately 15 respondents were selected from each of the three resource agencies (ADEC, ADNR, ADF&G) and three respondents were selected from the Alaska Department of Transportation and Public Facilities (ADOT&PF), the Alaska Department of Commerce and Economic Development (ADEC), and the Division of Governmental Coordination (DGC). Each management team member also identified a list of alternate respondents to be used in case interviewers were unable to reach an initial respondent or the respondent indicated an inability to participate. In addition to the agency respondents, one respondent was identified from each of the 33 coastal districts. This person was generally the coastal district representative, who is usually a planner in the larger jurisdictions but often a city manager or mayor in the smaller ones. The total pool ended up being a group of 85. Table 3-1 summarizes this group.

Table 3-1
Survey Respondents
Selected and Interviewed

	Number Contacted	Number Attempted
ADF&G	11	15
ADNR	12	14
ADEC	13	14
DGC	3	3
ADOT&PF	3	3
ADCED	3	3
Districts	25	33
Total	**70**	**85**

3.3 Interview Procedures

The interview process began by contacting the respondents. An initial letter was sent to each of the 85 respondents by the management team to describe the project, explain its purpose, provide background and a cumulative impact definition, describe the survey method, request their participation, and indicate that HDR interviewers would be contacting them. HDR interviewers were to make three attempts to contact each respondent. If respondents were not available, were unwilling to be interviewed, or did not return calls after three attempts to reach them, HDR contacted an alternate respondent on the list.

When respondents were reached, they were asked whether they had received the initial mailing and had had a chance to review it. If they had, they were asked whether they were available for an interview at that time, or if they were willing to set up a time for an interview. Where the respondents had not seen the mailing, or where they could not remember the exact purpose for the project, the interviewers reviewed the purpose of the project and described the interview process, and sent via fax a copy of the letter on request.

Before beginning the questions, HDR provided introductory points regarding the project. The information given to each respondent was as follows.

- All individual responses will be kept confidential (that is, only the interviewer will know the respondent's name).
- The survey is designed to find out where problems are located, what sorts of problems exist, and how you address them. Though the project is funded through the Alaska Coastal Management Program, all cumulative impacts are of interest.
- In each part, we will first ask an open-ended question (like how do you accomplish "X"), followed by multiple choice type questions (such as do you use the following methods to accomplish "X").
- We are happy to repeat or clarify any interview questions.

- It is perfectly legitimate to answer "I don't know," and frank responses are the most useful to the purposes of the project.
- If interested, you will be sent a copy of the draft report of the project findings, for their review and comment.

The survey instrument was pretested on five individuals to ensure that questions were understood and that answers resulted in information required for the objectives of the study. The pretest revealed that the time it took to conduct the survey (as initially written) was at least 50% above the amount anticipated. The time required (a minimum of 50 minutes, to a maximum of 1 hour 50 minutes) proved to be a burden of time and effort for respondents. Moreover, arranging for such an extensive time for interviews in respondents' busy schedules was exceptionally difficult and time consuming. Most importantly, such a long interview process was deemed to have the likelihood of some unintentional negative side effects, particularly a high non-response rate and potentially negative associations with the cumulative impact issue and the cumulative impact section 309 Strategy. In recognition of the busy schedules of the respondents, the limited interviewing budget, and the desire to have time to talk with each of the selected respondents, the survey instrument was consolidated. The survey was revised to ensure that the critical questions were retained, bias was eliminated, questions were asked in such a way that the information could be analyzed and summarized in a useful way, and duplicative and nonessential questions were eliminated. The final survey instrument required a minimum of 20 minutes to administer and a maximum of over two hours to administer. The average time was approximately 40 minutes.

To maintain a high degree of consistency among respondents, only three HDR project team members served as interviewers. Before the interviewing began an orientation session was held to review and initiate the interviewers on the survey procedures.

Each interview was conducted from the survey instrument; thus each respondent was provided the same information about the survey, asked the questions in the same order, and, as closely as possible, the same wording for all questions. Prompting and follow-up questions were used to elicit more complete and accurate information where it was clear the respondent did not understand the question as written. Interviews that had to be cut short were rescheduled and continued by the same interviewer from the point at which they left off.

At the end of each interview, the respondents were thanked for their time and contribution to the study. The address used for the initial mailing was confirmed. Responses were recorded in the spaces provided on the survey. For open-ended questions, all responses were recorded in words as close to those that were spoken by respondents. To ensure that information was still fresh (and therefore complete) when it was documented, interviewers completed a written record on the survey instrument directly after conducting each interview. Each interview was timed and the time recorded on the survey instrument.

3.4 Analysis of Survey Results and Application of Evaluation Criteria

Both qualitative and quantitative assessments of the survey results were performed. Questions which lent themselves to database manipulation were entered into a Microsoft Access database. These questions primarily involved the closed questions on the survey instrument. Some open-ended questions were coded and entered into the database. Because of the nature of the information gathered through interviewing, very few descriptive statistics were run on the data. Frequencies (raw counts) and some means were calculated but no variances, standard deviations, or cross-tabulations were run. The frequencies were run by geographic area, agency, and district.

To help in the qualitative assessment, hand written notes made by the interviewers for all open-ended questions from all respondents were typed onto a survey form. The exceptions to this step were responses to Questions 4 through 8 and 12b, which were not entered into the survey form but were coded manually for analysis. This allowed HDR to see all responses together, to qualitatively assess the results as a whole. The survey instrument, with typed responses is contained in Appendix C.

In conjunction with the survey design, two sets of evaluation criteria were developed to evaluate the effectiveness of how cumulative impacts are addressed, (1) to evaluate the effectiveness of specific techniques and methods used by practitioners, and (2) to evaluate the success of those methods being used overall, at a statewide level. The criteria were developed through a joint effort by the Cumulative Impacts Management Team and HDR. Management team members and HDR project team members each suggested lists of potential criteria, and through discussions, HDR consolidated the criteria to meet the requirements of the original request for proposals while also trying to faithfully represent and incorporate all criteria presented by the individual management team members.

The purpose of the first set of criteria was to evaluate the effectiveness of a given technique or method used (the steps taken) by respondents to address cumulative impacts. For this purpose, the evaluation criteria are as follows:

- Adequate steps are taken to identify the nature and extent of a potential cumulative impact. In other words there are adequate measures to define the "problem," its causes, its effects, and particularly whether the impacts from the problem are adding up over time (or are likely to) from past, present and foreseeable future causes.

- Adequate steps are taken to consider whether the cumulative impact requires action. That is, the cumulative impact is judged or measured against some recognized threshold or standard.

- Adequate steps are taken to control the cause of the cumulative impact to prevent, stop, minimize, or mitigate the affects of the cumulative impact.

- Effectiveness of the steps taken is measurable in the field, in the economy, in the culture, or in the social system affected, and it is in fact measured in some way such as with on-going monitoring.

While there are potentially numerous additional detailed criteria which could be applied, the above four are the principles which are applied in analysis of the compiled qualitative and quantitative results. These criteria must be met in order for a method to be effective, and for practitioners or others to know how effective it is.

A series of questions was designed to directly ask survey respondents how they identify (Questions 4a, 6, and 11a) consider (Questions 4b, 7, and 11a), and control (Questions 4c, 8, and 11a) cumulative impacts and how adequate and effective they feel those methods have been (Questions 4d , 4e, 11b, and 11c).

The second purpose of evaluation was for HDR to provide an independent assessment of whether the steps being taken are adequate and effective statewide. Several additional questions were specifically designed to do this. In creating these questions, HDR and the management team developed a list of elements (criteria) deemed important to have in place, for practitioners to yield effective results. The elements deemed important and gauged by the survey include:

- Having a clear definition of what cumulative impacts are (Question 1, and 10);
- Having authority in statutes, regulations, and/or policy (Questions 2, and 2b);
- Having directive to address cumulative impacts (Questions 2, 2b, and 10);
- Having clear guidance on how to identify, consider, and control cumulative impacts (Questions 10, 13a, 13b and 14);
- Having experienced, competent, trained staff (Questions 10, 12a and 12b);
- Using techniques for addressing cumulative impacts (Question 11a);
- Using methods which result in political/institutional support for controls (Question 10);
- Having adequate resources, including staff time and funding (Question 10);
- Having sufficient information for decision making (Question 10 and 11a);
- Using resources, information, and methods to accomplish cumulative impact controls (Questions 4d, 4e, 8, 11b, and 11c); and
- Applying measures to determine whether the methods are controlling cumulative impacts (11a, 11b, and 11c).

By analyzing survey results in relation to the four criteria and the elements listed above, an overall evaluation of the effectiveness of current practices was developed. This evaluation is presented in Chapter 4.0.

To help illustrate the range of cumulative impact work going on in the state, site examples were chosen. These site examples illustrate typical processes of addressing cumulative impacts or particularly successful or innovative techniques. These site examples appear as "Cumulative Impacts in Brief" in sidebar boxes throughout Chapter 4.0.

4.0 Findings

4.1 Introduction

This chapter presents the findings regarding where cumulative impacts occur and how they are addressed by state agencies and coastal districts. The findings are based on individual telephone interviews conducted in March and April (1995) with the selected state agency and local coastal district representatives. See Section 3.3 "Survey Sample" for more information on the interview participants.

Of the 85 potential interview participants contacted by HDR, 70 were available and willing to complete interviews—a return of 82% of the initial survey pool. Eighty-two percent of agency respondents were interviewed (43 out of 52). Seventy-six percent of district respondents were interviewed (25 out of 33). The compiled results are presented question by question in Appendix C. On that survey instrument, frequency counts are listed for each of the closed questions to indicate the numbers of respondents who answered a certain way. For those open-ended questions for which it was appropriate, the transcribed notes of the interviewers are typed in. This appendix is a useful reference during review of the findings presented in this chapter.

The findings are discussed below question by question, except in some cases where related questions are discussed together. In these cases, the questions do not all appear in numerical order. The survey questions were designed to elicit information which pertained to the criteria listed in Section 3.4. Each of the questions is intended to provide information that is deemed important to applying the criteria or in making a judgment on whether each criterion is being met. For example, having practitioners that know and understand the definition of cumulative impacts is considered crucial to taking steps in adequately identifying, considering, and controlling cumulative impacts.

4.2 Respondents' Frame of Reference

Several questions were asked about the respondents' knowledge and frame of reference in addressing cumulative impacts. These questions were asked to identify what levels of skills, background, and knowledge program practitioners have for addressing cumulative impacts. It should be noted that shortcomings identified in this section do not necessarily reflect inadequacies of the program practitioners, but rather gaps in the current statewide practice of addressing cumulative impacts.

Question 1: Cumulative Impact Definition. To be successful at addressing cumulative impacts, one important consideration is that those responsible for addressing them know what they are. In the first question of the interview respondents were asked, "What does the term cumulative impact mean to you?" This question was intended to identify how many respondents have a working concept of cumulative impacts, and whether or not their

concepts resemble the definition used by the Council on Environmental Quality (CEQ), which was adopted for this study.

Sixty-four percent of the respondents had a working definition of cumulative impacts which resembled the CEQ definition, and 36% did not. Agency respondents were more apt to have a working definition than coastal district respondents with 79% verses 40%, respectively. In the northern region of the state, only 43% overall had a working definition verses 66% and 71% for the southcentral and southeast regions, respectively. The results are not poor, but considering that the introductory letter to respondents provided a general definition, the percentages are somewhat low. This may suggest the need for an educational campaign, especially to reach out to some of the smaller, more remote coastal districts.

Cumulative Impacts in Brief

Site: South Unalaska Bay, Unalaska

Cumulative Impact: Multiple seafood processing plant discharges, among other impacts, have been accumulating over several years in the semi-enclosed nearshore marine environment of the bay. Beachcombers complained about wastes occasionally washing up on the beach.

Steps to Address it: Processing plants are required to monitor the size and volume of their seafood waste piles on the bottom of the bay and dissolved oxygen levels. Plant operator monitoring has identified depressed levels of dissolved oxygen in the water at certain times of year. The Environmental Protection Agency (EPA) evaluated the data from the site and decided to require a reduction in pollutants discharged. A Total Maximum Daily Load (TMDL) was established by EPA to reduce pollutants, specifically seafood wastes and biochemical oxygen (BOD). This allocates "shares" of pollutants for each discharge to abide by in their respective processing operations.

Notable Features: In a fairly defined coastal area, with known, regulated pollution sources, hard data could be collected from the permittees and through agency field work on site. Once the cumulative impacts were identified and confirmed, they were considered against recognized federal and state water quality standards and violations were clear. In this case the regulatory agency had the authority and direction to enforce an additional control measure through the NPDES permit which assigns specific responsibilities for reducing the collective impacts. The TMDL was issued in February, 1995 and revised permits have not been issued, so its success is not yet known, but it appears to be an effective method for addressing at least one source of cumulative impacts in Unalaska Bay-seafood waste discharges.

After asking respondents for their definition, the definition or concept used for this study was read to each of them. This was necessary to make sure that all respondents had the same concept in mind before proceeding with the remainder of the interview. Establishing a common point of reference on what cumulative impacts are and how they are distinguished from isolated impacts was deemed important to the collection and analysis of survey responses.

Question 2: Direction and Authorities. A major shortcoming of any attempt to address cumulative impacts through the ACMP or otherwise appears to be the lack of statutes, regulations, enforceable policies, or other direction or guidance on cumulative impacts. When asked if their coastal district or agency was directed by statute, regulation, or enforceable policy to identify, consider, and/or control cumulative impacts, 40 out of 70 respondents (57%) indicated that they were unaware or were unsure of direction regarding cumulative impacts. Statutes, regulations, and enforceable policies are not specific enough in their approach to cumulative impacts to be used by agencies and

districts to appropriately consider and control cumulative impacts. In the case where the respondent indicated that direction exists for addressing cumulative impacts, most of that direction was weak at best. Respondents indicated that the state statutes and regulations "indirectly," or "implicitly" addressed cumulative impacts. Several respondents indicated that it was federal law or regulation which provided direction, noting that this direction was often only relevant to federal actions or projects funded with federal money. Only one respondent specifically cited "use of direct and significant impact" within the ACMP statutes (*6 AAC 46.40.210)* and the fact that this phrase includes cumulative adverse affects. See Appendix C, Question 2.

Question 13: Internal Guidance. Respondents were also asked if they were aware of any written guidance within their agency or coastal district for addressing cumulative impacts. The majority of respondents were not aware of any guidance. In fact, only 16 out of 70 (23%) indicated that they were aware of any internal guidance. Those that were aware that guidance was available, generally found that guidance to be useful. The guidance was mainly used to generate an awareness of cumulative impacts or for process or assessment procedures. The more specific the guidance was on actually providing a process, or specific standards, the more successful it appeared to be to respondents. See Appendix C, Question 13.

These questions revealed that there is a lack of direction and guidance, or at least a lack of knowledge about what direction and guidance exist. Moreover, respondents criticized the direction that does exist, indicating that it only indirectly relates to cumulative impacts. Without more specific commitment, direction and authority from the state, cumulative impact identification, consideration, and control will continue to be applied haphazardly and inconsistently, if at all. Agencies have a limited ability with which to address cumulative impacts and lack the political support to fund and staff the positions necessary to effectively work on cumulative impacts. In the absence of legislation or regulation more specific to cumulative impact assessment, additional internal guidance could resolve this.

Question 12: Work Experience. Experience is an important component to a successful program of addressing cumulative impacts. Respondents were asked about their experience at the end of the interview. In general, respondents from agencies and larger coastal districts have background in addressing cumulative impacts. Over 64% of the respondents have had some type field experience either in their current job or in previous jobs. Moreover, over 74% have had positions other than the present one in which they encountered cumulative impact issues. This would indicate that there is a good balanced pool of personnel available with a wide range of experience. The general observations of the interviewers is that those in the smaller coastal districts had less direct experience in addressing cumulative impacts. Often their position was city mayor, or city clerk, or city manager, and yet among their duties was the implementation of the coastal management program. Conversely, state agency people did not generally have prior experience dealing with cumulative impacts at the local level. Very few individuals indicated that they had private sector experience with cumulative impacts. These observations could indicate a

gap in the common understanding of cumulative impacts amongst state, local, and private interests.

4.3 Geographic Areas

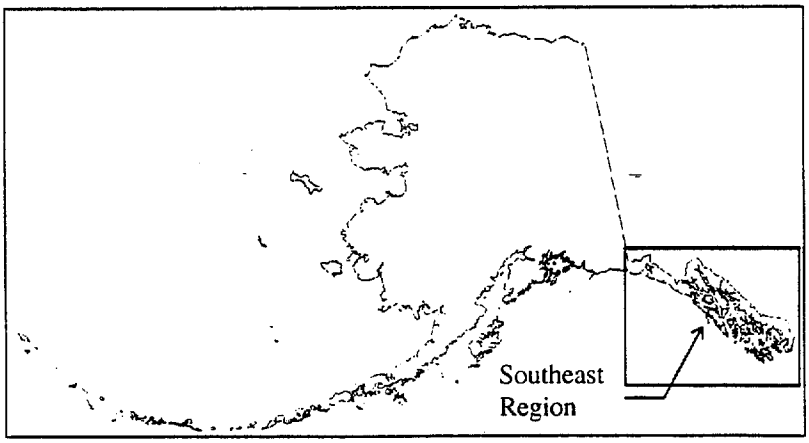
This section presents a discussion of the sites which respondents indicated were experiencing cumulative impacts. Respondents were asked the question: "Are there geographic sites in your jurisdiction/area of concern where you believe uses and activities are causing environmental, economic, social, or cultural effects to add up over time?" Ninety percent of the respondents indicated that they know of sites that were experiencing cumulative impacts. For the 63 respondents that answered yes, they were asked to name and locate the site resulting in a list of over 175 sites. They were then asked to note the environmental resources or economic, social, or cultural uses that are affected and the cause of the impacts. In general, cumulative impact problems are specific and localized, occurring in areas of concentrated use and settlement. Problems often relate to water quality, impacts to habitat, and quality of life considerations such as recreation experience and subsistence. Finally, the definition of sites often remains general, such that respondents rarely identified problems in specific terms. For example, what habitat, or what aspect of the habitat is being impacted. The complete list of sites, resources affected, and causes cited by respondents is contained in Appendix D. A brief discussion of the sites by region appears below.

Statewide Sites. Several respondents expressed concern over rural Alaskan villages, stating "every small village" or "95% of the small villages" are experiencing cumulative impacts. The main resources affected were listed as public health facilities such as drinking water systems and solid waste disposal. The main causes of the impacts according to respondents were lack of a tax base or means to combat the problems. Other cumulatively impacted statewide sites noted included all transportation facilities, waters on the statewide impaired waterbody list, placer mining sites, state special areas (such as state habitat areas and game refuges), and development impacting all larger communities.

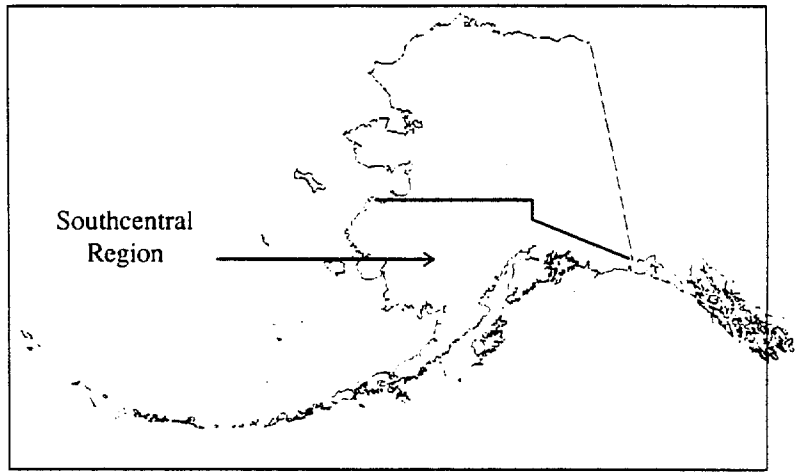
Southeast. The southeast region includes all Alaska communities and coastal districts east of the 141st meridian. The most frequently mentioned sites were Ward Cove in Ketchikan, Thorne Bay northwest of Ketchikan, and the Juneau area.

Respondents indicated that the main resource being affected in Ward Cove is water quality, which in turn affects fish habitat and air quality. In this area a number of sources of impacts add up to cause the cumulative problems. This includes discharge from a pulp mill, waste from seafood processors, runoff from homes, and industrial and residential air emissions. A similar situation is occurring in
Thorne Bay, where discharge from a pulp mill, storm water runoff from the community, bark deposition, and pollution from the small boat harbor, added together over time to impact the water quality. The Juneau area is experiencing cumulative impacts in a number of areas in and around the city. Water quality, which

has been impacted from urban and industrial development and boat traffic; air quality and visibility, which are impacted by wood smoke and cruise ships; and wetland and other habitats, which have been lost due to urban encroachment, are some of the cumulative impacts occurring. Numerous other sites (streams, bays, and habitat) were mentioned as being impacted from the cumulative affects of logging. For instance, over 25 individual creeks and 8 bays were cited as being impacted by logging.



Southcentral Alaska. The southcentral area, as shown on the accompanying map, includes all of the Anchorage area, the Kenai Peninsula, the Kuskokwim Delta, and southwest Alaska. The areas most often mentioned by respondents as experiencing cumulative impacts include wetlands and creeks in the Anchorage area, and the marine environment of Unalaska Bay, rivers on the north and west side of Cook Inlet, creeks near the road system, rivers and fishing areas on Kodiak Island, and the rivers and marine enviornments on the Kenai Peninsula, particularly the Kenai River and Kachemak Bay.



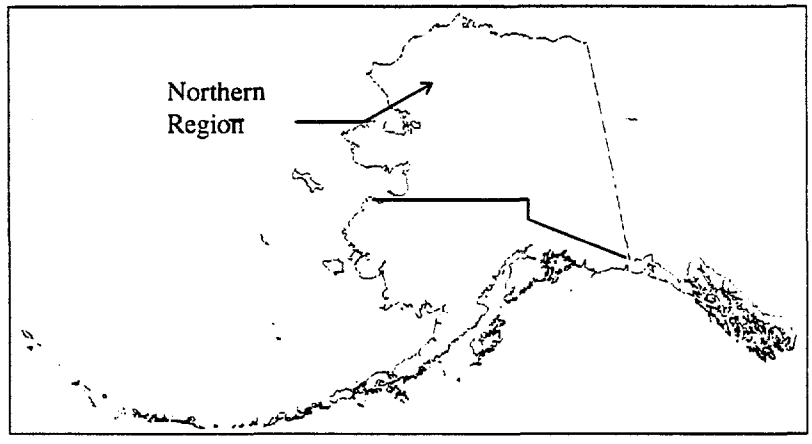
Wetlands in Anchorage have mainly been lost to residential and industrial development thereby impacting riparian and terrestrial habitat and water quality. Several respondents mentioned that the Anchorage area creeks (Ship Creek, Chester Creek, Campbell Creeks) have been impacted by community expansion, runoff, and military contaminants, and this has degraded fish habitat and water quality. The Unalaska Bay and Dutch Harbor have been impacted by disposal of fish processing wastes and fill, and harbor activities. The result has been a cumulative effect on the water quality and marine habitat of the bay.

According to several respondents, rivers and habitats in the Cook Inlet area, including the Susitna, Little Susitna, Deshka, Yentna, and Talachulitna Rivers and the Susitna Flats and Matanuska Valley state game refuges, are being impacted by increasing public recreational

use, timber harvesting, and grazing. Similar activity is occurring along rivers and streams accessible to the southcentral road system. Streams, such as Deep Creek on the Kenai Peninsula, are experiencing increasing public recreation use which in turn is impacting fisheries, wildlife, and the experience of the users. Finally, according to several respondents, areas such as Ayakulik River, Pillar Creek, Near Island Channel, and the Karluk River and Lake on Kodiak Island are also experiencing cumulative impacts. The main causes are increased commercial and sportfishing use, tourism.

Finally, the Kenai Peninsula was frequently mentioned as experiencing some of the heaviest cumulative impacts in the state. Impacts in this area range from wildlife habitat destruction due to grazing at Fox River Flats, to water quality and fisheries resources degradation in Kachemak Bay caused by increasing residential development, tourism, and fishing pressure, to salmon stream degradation caused by logging, residential development, and fishing. The most studied and the most impacted site mentioned is the Kenai River.

Northern Alaska.
The most mentioned site in the northern region (shown on the accompanying figure) was the Prudhoe Bay oil and gas development complex. The oil exploration and development that has occurred in this area has impacted wetlands, lakes, caribou, cultural resources, air and water quality, vegetation, waterfowl habitat, and the near shore marine habitat of the Beaufort Sea. The causes of the impact is the incremental development of gravel pads, roads, spills, debris, gravel mining, noise, pipelines, dust, and human activity accumulated over time that has accompanied oil and gas development.



Another frequently cited cause of impacts was mining. Several respondents mentioned the Red Dog Mine and other mines near Nome as generally impacting air, water, visual, habitat, and other resources. Mining has also caused impacts near Fairbanks (Fort Knox Gold) and along drainages of Interior Alaska. Causes include runoff, tailings, storage, shipment, road building, human activity, and ore loading and shipment. Other cumulative mining impacts cited by respondents include placer mining on the Seward Peninsula, which has impacted streams, fish habitat, and cultural values. Gravel mining for road building was another cause of mining-related impacts.

Urban development around Fairbanks was cited as the cause of cumulative impacts by respondents. The North Pole area experiences severe flooding due to poorly located residential development. The south Cushman Street industrial area is contaminating

ground water due to the industrial shops' use of leaching pits for wastewater disposal. Air quality caused by development is also of concern. For a complete list of the sites, resources affected, and the causes identified by respondents, see Appendix D.

4.4 Addressing Cumulative Impacts

One of the main purposes of the project was to assess the methods used to address cumulative impacts in Alaska. The process of addressing cumulative impacts was broken down into three steps namely, (1) cumulative impact identification, (2) cumulative impact consideration, and (3) the cumulative impact control. In other words, how do practitioners typically learn that cumulative impacts are occurring, how do they decide the impact is serious and what should be done about it, and finally what actions do they take or what techniques have they used to keep the impacts from getting worse? It should be noted that these steps do not represent an official process, either mandated in regulation or set forth in theory as an absolute. They are presented to provide a framework for discussion. In actual practice, the same techniques may be used in one, two, or all three steps, the steps may be merged together, or they may occur in a different order.

4.4.1 Identification of Cumulative Impacts

The identification step of addressing cumulative impacts is that step where the practitioner determines or learns of a cumulative impact. Questions in the interview were intended to determine how respondents learn of cumulative impacts and what techniques or methods are used to identify cumulative impacts.

Questions 4a and 6: Identifying Cumulative Impacts. To obtain information on the process, respondents were asked to choose the site or situation they knew the most about and then were asked, "How was it determined that impacts were adding up and causing problems over time?" Later, if the steps they described in Question 4a were atypical, they were asked to describe more common practices (steps or techniques) used to determine whether a cumulative impact is occurring or has the potential to occur.

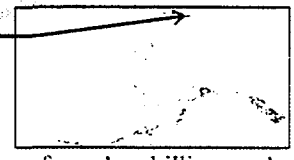
Findings indicate that overall, the process used is very informal and is often not specifically intended as a means of identifying cumulative impact. The two most common methods for identifying cumulative impacts were through "public complaints" and "personal/ professional observation" and not through a formal process." In general, practitioners are not specifically looking for cumulative impacts. Formal processes or methods are not employed specifically for cumulative impact identification. The impacts are identified through the processes of normal job routines. Thus, permitters identify cumulative impacts during permit reviews either through public comment on the permit or based on professional judgment during the permit application and review process. Similarly, planners identify cumulative impacts during public meetings on a plan, and those that write or review environmental documents identify them during the Environmental Impact Statement (EIS) scoping process. The most formal methods were used by those practitioners that actually monitor or conduct special studies for impacts. These

practitioners often have extensive field responsibility and use hard science in their jobs. Thus, biologists in the ADF&G and health scientists in the ADEC were more likely to use monitoring. The use of monitoring and special studies does, however, similarly fall within the normal job duties of these professions (such as water quality or air quality testing, habitat or species surveys, and so on) and were not usually conducted specifically to look for cumulative impacts.

By "coding" or sorting the responses to Questions 4a to 6 into categories, the following techniques for identifying cumulative impacts were determined. These techniques are ranked roughly based on the frequency of response. While responses to Question 4a provide a good indication of the types of techniques used to identify cumulative impacts and describe briefly how they are used. Because the questions were open ended, it likely does not provide an accurate "count" of the frequency with which these techniques are used. The reason for this is that many respondents simply do not think of a particular technique when asked cold, with no prompts. However, used in conjunction with Question 11a, it provides a more clear picture of the numbers and rankings of the techniques by their frequency of use (see section 4.6). It should be noted that respondents often used and identified more than one of these methods and often used the techniques listed below in conjunction with one another.

Cumulative Impacts in Brief

Site: North Slope Oil



Cumulative Impact: The combination of roads, drilling pads, physical use of the land, noise, dust, and aircraft and boat traffic has a cumulative effect on wildlife (particularly caribou), subsistence uses, and air and water quality.

Steps to Address it: Potential oil exploration problems have come to agency attention from public comment during meetings about specific projects, most recently on whether to open or close the Arctic National Wildlife Refuge to oil exploration. Through personal observation and anecdotal stories of subsistence users, it was determined that the cumulative problems in this area need attention. The steps taken to control the impacts have been to remind agencies of their responsibilities, to notify the congressional delegation, through implementation and enforcement of the borough's permitting, zoning, and other planning authorities, the actual filing of, as well as the threat of law suits, and the application of political pressure through participation in coalitions which have included at times Native organizations, environmental groups, the oil industry, and commercial fishermen associations.

Notable Features: This case example highlights very typical identification and consideration steps used in the state. Most districts and many agencies do not have a formal process to identify and assess cumulative impacts, particularly those occurring beyond the scope of their own limited jurisdictions, but rather rely on public comment and informal discussions to assess whether there is a problem. Moreover, it highlights the subjectivity that often accompanies a cumulative impact. For example, while the public may fear a cumulative impact, the oil companies will argue there is none. Whether there is one or not is very often debated.

- Public Comment - Public complaints on nuisances or comments during EIS scoping, permit review, and public meeting on pending plans, for example. were the most commonly mentioned ways in which practitioners identify cumulative impacts.
- Professional Judgment - This method included personal observations often when in the field, or during permitting, planning, or EIS review.

- No Process - Many respondents indicated they take no steps specific to cumulative impact identification or have no formal process. Although several respondents indicated that there was no "process" specific to cumulative impact identification, they nonetheless may have used techniques which did in fact allow them to identify cumulative impacts.
- Monitoring (tracking permits, taking samples, photo documentation).
- Field Investigations (field surveys, site visits) - This method is used heavily in conjunction with professional judgment.
- Agency Identification - Through contact with, or directly from other agencies many respondents noted that they identify a cumulative impact when another agency comments on a plan, permit, or EIS review.
- Planning Processes - Public comment on a plan during a planning process sometimes identifies cumulative impacts.
- Permit Application and Review - Public comment or professional judgment during a permit process identifies the cumulative impacts.
- Modeling and Special Study - Some respondents identified cumulative impacts through the use of a special study. Most uses of special studies or monitoring identified cumulative impacts when investigating an activity for some other reason. Only in a very few instances was a special study conducted specifically to look for cumulative impacts, (such as Section 309-funded studies on the Kenai River).

If the ability of respondents to list sites experiencing cumulative impacts is any indication of the success of the methods used to identify those sites, then we can say that the techniques used for the identification step are working. Clearly respondents are able to identify sites across the state. They understand the causes and know what resources and uses are being impacted. See Section 4.3 and Appendix D, for a discussion of the identified cumulative impact sites. In general, however, the methods used to identify cumulative impacts are not specifically intended to identify cumulative impacts. Most often they result out of a process intended for other purposes. One reason for this is that practitioners do not have a mandate to look for cumulative impacts. Interestingly, however, many respondents indicated that whether or not an impact is occurring is a matter of perspective and opinion and is often in dispute. Moreover, the point at which an adverse cumulative impact occurs (the threshold) was identified as being a subjective or a political decision in many instances. The result is that impacts are not always clearly defined nor specific but are often politically defined and disputed. Thus, while respondents are able to identify sites, which in their opinion (which they "know") are being cumulatively impacted, what is "known" is often disputed. While respondents were told that cumulative impacts include reasonable foreseeable future impacts, few respondents discussed future impacts. It appears that obtaining consensus in identifying currently impacted areas is difficult enough, to identify "reasonable foreseeable future impacts" would be even more disputed.

A limitation of this report and with may of the methods used by respondents, is the lack of field verification. Generally respondents indicated the value in field verification but often

cited the lack of money and time to adequately study and verify cumulative impacts in the field. This study relies on the opinions of the experts which generally rely on their professional judgment and public outcry to identify cumulative impacts.

4.4.2 Consideration of Cumulative Impacts

The consideration step of addressing cumulative impacts is that step where practitioners assess or determine whether there is a problem severe enough to require action and determine the actions they should take to try to control the problem. In other words, after they know a cumulative impact is occurring or is likely to occur, what do they do to decide that the cumulative impact is significant and needs attention? Moreover, how do they determine what attention it needs?

Questions 4b and 7: Considering Cumulative Impacts. Respondents were asked to explain how they determine that problems need attention and to discuss the processes or techniques used to consider cumulative impacts. Very similar techniques are used in this step as those used in the identification step but with a slightly different emphasis. The most frequently received response was that "no process" or "no formal process" was used "specific" to cumulative impacts. Monitoring, professional judgment, and special studies were the next most frequently used steps for considering cumulative impacts. In general it appears that after learning of a problem, agencies and districts take a more focused structural approach to assessing whether or not that problem is significant. Monitoring the problem and studying it are the most frequent precursors to taking action.

A ranking of the respondents' methods used for considering cumulative impacts was generated from the responses to Questions 4b and 7. These methods are listed below. For more information on the actual frequency with which respondents used each of these techniques, see section 4.6.

- No Formal Process - Many respondents stressed that there is not really a formal or official effort made to consider or evaluate cumulative impacts. This indicates that there are not explicit steps used to assess cumulative impacts and where there are specific steps employed, they are not usually applied specifically to cumulative impacts.

- Monitoring (tracking permits, change, sampling measurable impacts, and so on)

- Professional Judgment - This method involves making a field visit to assess a complaint or situation, or employing a professional judgment on the information available or collected. This technique is most used in situations where impacts are not measurable or information, time, funding, or scientific assessment is unavailable.

- Special Study - Special studies were commissioned but not usually to specifically look at the cumulative impacts. Most of the special studies that have been commissioned to assess cumulative impacts are listed in Section 2.4.

- Public Comment - The use of this method can best be described as the "squeaky wheel syndrome." Many respondents indicated that the process can be very political and not necessarily based on methodical assessment. Sometimes projects are stopped simply because public outcry indicates concern even though no assessment indicates that there is a cumulative impact. Conversely, even though an assessment may indicate a severe or impending cumulative impact, consideration of whether and how to control the impact is often decided by public sentiment.

- Application of Regulations or Planning Policies - This technique is often used in conjunction with professional judgment and is closely related to permit review. Practitioners look to coastal management plans, comprehensive plans, regulations, legislation, or special area management plans for policy guidance on whether an identified cumulative impact is acceptable. Potential problems with this method are described in section 4.2.

- Permit Review - This technique is usually used in conjunction with applying professional judgment, or regulations and planning policies.

- Internal Discussion - This technique was mentioned by a few respondents in the open-ended question and by many respondents in the closed question (see section 4.6). It is likely a technique used in nearly all agencies and districts usually as a component of some other method.

• Cumulative Impacts in Brief

Site: Jakolof Bay

- ***Cumulative Impact:*** Like several popular bays on the lower Kenai Peninsula, Jakolof Bay is being impacted by high recreation density and increasing fishing pressure. In this case, the demand for mariculture in the bay where there is already residential development is the perceived source of cumulative impacts.
- ***Steps to Address it:*** The problem was identified by public comment and assessed by professional judgment during the permit review process on a batch of approximately 13 mariculture permit applications. Permit stipulations were placed on the permits to require such controls as setbacks between farms, banning of shore ties, and closing the area to additional farms.
- ***Notable Features:*** The control methods have been successful. However, this case highlights the effect that strong public and political sentiment has on the process. The strong permit stipulations and moratorium on additional farms stemmed more from politics than from science. Better public education has been suggested as a way to bridge the gap between what scientific assessment indicates and what the public believes.

To most respondents the phrase "consideration of cumulative impacts" seemed unclear, perhaps because they did not understand the phrase or because few processes for considering cumulative impacts exist.

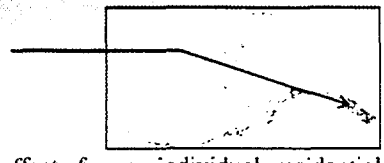
4.4.3 Control of Cumulative Impacts

The third step in addressing cumulative impacts is controlling the impacts. The survey was designed to determine the kinds of methods used to control cumulative impacts in Alaska. In other words, after a cumulative impact has been identified and determined to need attention, what kinds of actions are taken to prevent or remedy a cumulative impact?

Questions 4c and 8: Controlling Cumulative Impacts. Respondents were asked to discuss steps they have taken to address the cumulative problems at a specific site of their choosing. If these techniques were not typical, respondents were asked to discuss kinds of actions they typically take to control or limit cumulative impacts in their more common practices. The most used method for controlling cumulative impacts is through the use of permits and special permit stipulations. This is followed closely by or used in conjunction with coordination among the applicant, other agencies, or task forces. A rough ranking of the actions used by agencies and districts in controlling cumulative impacts, based on frequency of response in Questions 4c and 8, includes the following:

Cumulative Impacts in Brief

Site: Mendenhall Valley, Juneau



Cumulative Impact: The added effect of many individual, residential wood stoves and road dust caused a cumulative impact on air quality and made the area fall below federal air quality standards.

Steps to Address it: After public complaints mounted, direct monitoring of the air was used to determine if air quality standards were violated. The local and state governments worked together to create and enforce a wood smoke ordinance and fund an aggressive paving program to reduce the emissions and airborne particulates to acceptable levels.

Notable Features: This process highlights the success of a cooperative approach that is often needed to control cumulative impacts. Other keys to its success were: public support and acceptance measurable impacts with clearly identifiable causes, political acceptance and willingness to confront the problem, identified funding to fix the road dust problem, and enforcement of the ordinance.

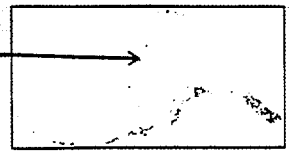
- Permit Stipulations/Permitting - Mitigation and minimization, often done through permit stipulations or physical/engineering changes in the design
- Work with Agency, Applicant, and/or Task Force - This item was used frequently with other measures. Cooperating and helping an applicant was often deemed successful as opposed to being combative.
- No Formal Process - While respondents often listed methods that they used in controlling cumulative impacts many indicated that there is no formal process or that the methods were not applied specifically to cumulative impacts.
- Amendments to Policy or Plan Documents.
- Education - Making the issue known to the public or other agencies.
- Enforcement of Regulations.

- Monitoring or Documentation of the Problem. Monitoring was used much more as an identification and consideration technique.
- Land sale or Eminent Domain. Buying the land or taking over management of a facility.
- Limitation of Access to Resource at Risk. This is often done through permit or licensing restrictions.

While several respondents indicated that these last two techniques are very effective, they are not widely used because of a lack of funding or political support.

Cumulative Impacts in Brief

***Site*: Streams on the Seward Peninsula**



Cumulative Impact: Each year a bit more stream habitat is lost due to channelization and erosion from in-stream vehicle travel, mining operations and road building. This reduces the rearing capacity of streams for anadromous and resident fish.

Steps to Address it: A series of reports by private consultants and agencies, including ten years of on-the-ground observation helped identify the problem, which was confirmed through specific study which included monitoring the density of fish populations in disturbed and undisturbed streams.

Notable Features: The measures used to control the cumulative impacts have been exemplary. Steps taken or planned include: public education through radio and newspaper spots, road maintenance worker training which increased construction crew awareness of the resources at risk, increased presence and enforcement, and cooperative agency, industry, high school, and local civic group projects which have turned materials sites into fisheries enhancements.

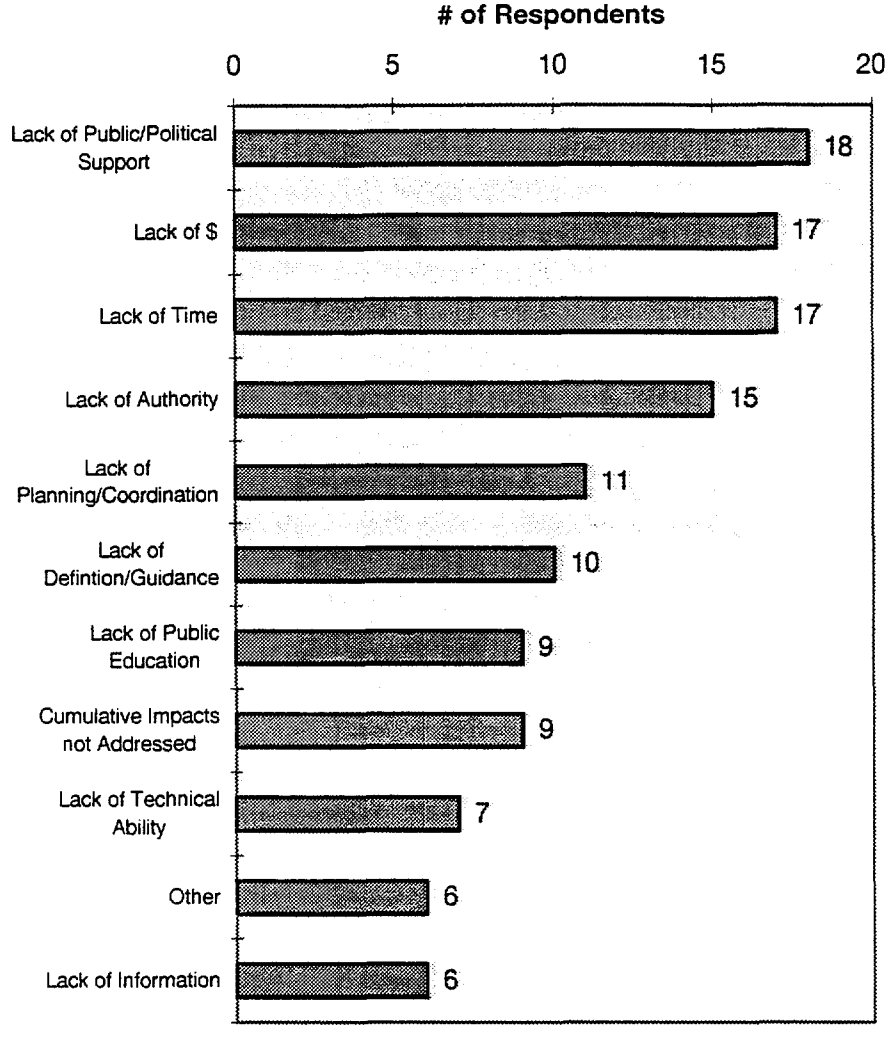
One of the main ways that impacts are controlled is through permit processes that lead to mitigation of project impacts. Nearly every agency and district has some type of permit process that works in a similar manner, from local conditional use permits, to each agency's permits, to the consistency review process. In general, project modifications and mitigation measures occur during a project's review period. These mitigation measures are often decided upon by working with the applicant and coordinating with the other agencies involved. The mitigation measures are then usually included as a permit stipulation on the authorization. According to respondents, such stipulations are most effective when they are linked clearly to the project impacts and when they are, in fact, enforceable. Problems with using stipulations tend to be the lack of follow through, due to time and funding constraints, to ensure that they are being met. Therefore, there is not always evidence that these measures actually control cumulative impacts nor are there always sufficient resources to ensure that the mitigation measures are employed and enforced.

Respondents often indicated the importance of monitoring and field presence in controlling cumulative impacts but usually reported they would like to accomplish more of this but do not due to insufficient resources. Many respondents indicated that there is not enough funding or staff time to allow them to know if methods are successful on the ground. These resource limitations are discussed further in section 4.5.

4.5 Obstacles and Difficulties

The existence of obstacles makes effective cumulative impact assessment and control difficult. A lack of obstacles would indicate that cumulative impacts are being addressed or, at a minimum, are not impeded from success. Obstacles to addressing cumulative impacts were identified in Questions 9 and 10 of the survey.

Figure 4.1
Obstacles Percieved by Respondents in Addressing Cumulative Impacts



Questions 9: Respondents were first asked the open-ended question: "What obstacles or difficulties, if any, do you face in identifying, considering, or controlling cumulative impacts?" Figure 4.1 indicates the coded categories of responses for all those answering the question. It should be noted that many people provided more than one answer and

thus the total number of responses is greater than 70. This question is closely related to Question 10 which asked a closed question with a list of obstacles from which respondents could choose. The open-ended question, however, provides slightly different information because the responses are not prompted, resulting in a more "pure" picture of what respondents perceive as key obstacles. Moreover, a comparison of the two questions enables us to gauge whether the list that was developed before the interviews missed any potential obstacles

Interestingly, the top four responses all point to a lack of recognition and acceptance of cumulative impacts as a problem by the state policy makers and leaders. While it was clear that respondents felt there are cumulative impact problems around the state (as evidenced by Appendix D), commitment by top-level management and policy makers in the state in addressing the problems is lacking. This is reflected in a lack of funding, political/public support, staff devoted to the issue, and authority, all of which were identified as obstacles by respondents. If cumulative impacts were acknowledged as an important concern by state government, there would likely be money and staff allocated to address cumulative impacts and legislation to provide stronger authority to back up that acknowledgment.

Question 10. Following the open-ended question, a closed question was asked which required respondents to identify obstacles from a list of potential obstacles devised by HDR and the management team. This list of obstacles is, in essence, a list of components necessary for successfully addressing cumulative impacts. For example, adequate direction, political support, funding, information, experience, and so on, are all deemed important components of an effective program. If a significant number of practitioners believe that obstacles to these components exist, this indicates that the success of current efforts is questionable. The list from which respondents could choose included.

- Inadequate direction, guidance, or tools with which to address cumulative impacts.
- Lack of political or institutional support for doing so.
- Insufficient time to pay attention to cumulative impacts.
- Insufficient funds to assess and evaluate cumulative impacts.
- Insufficient site-specific information (such as baseline data) about resources at risk.
- Insufficient information to determine whether a cumulative impact will be significant.
- Inadequate experience to address cumulative impacts.
- The absence of a definition of "cumulative impacts" established in regulation.
- Limited authority to address cumulative impacts, due to land ownership.

Cumulative Impacts in Brief

Site: Uyak Bay, Kodiak Island

Cumulative Impact: A land distribution program has made numerous lots available for development of residential and small lodge properties. The local public has called in complaints about the increasing number of people in the area and the fear of intensive private ownership on prime shorelines of the bay.

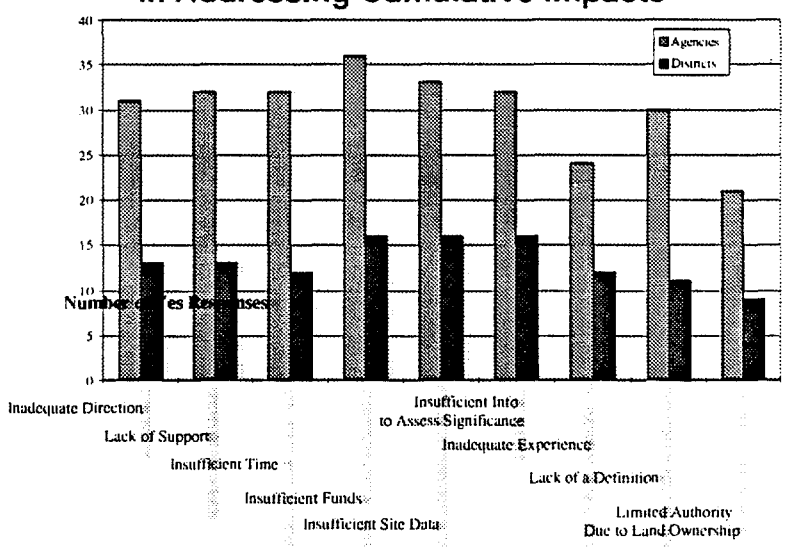
Steps to Address it: Based on complaints, public testimony and discussion at public meetings, the Kodiak Island Borough determined the concerns subject to Borough jurisdiction. The Borough issues permits for land use, but cannot has difficulty effectively enforcing permit regulations. The Assembly asked the Planning Department to look for models and suggest ideas for dealing with the potential impacts. The staff did so, but each recommendation (such as minimum lot sizes for rural areas) but recommendations were not forwarded to the Assembly's by PZL. .

Notable Features: Common obstacles are evident here, first a lack of concrete information on real impacts and a lack of political consensus on how to consider a potential cumulative impact once it occurs. There is local polarity of opinion on the level of resource development and protection.

It should be noted that the closed list of obstacle choices provided to respondents closely matched the coded list developed from the survey responses in Question 9. This would indicate that the responses obtained in Question 10 are representative of the range of likely responses for this question, with a couple exceptions. Had "lack of public education" or "conflicting value system" been provided as closed question choices, those answers would likely have received responses.

Figure 4.2 indicates the frequencies of the responses to each obstacle for agencies and districts. It is important to note that these are the perceptions of the 70 practitioners that were interviewed. In general, agency and coastal districts do not have adequate staff or time to identify, consider, or control cumulative impacts. The obstacle that received the largest number of responses was "insufficient funding to assess and evaluate cumulative impacts with 74% of respondents identifying this item. Closely following this was "a lack of information," with "insufficient site-specific information about resources at risk" (49 responses) and "insufficient information to determine whether a cumulative impact will be significant" (48 responses). These findings tend to indicate that there may be a lack of information to allow respondents to make assessments necessary to balance development and

Figure 4.2
Obstacles Perceived by Respondents in Addressing Cumulative Impacts



Note: This figure differs from Figure 4.1 in that questions were posed as closed yes/no questions. See discussion of Question 9.

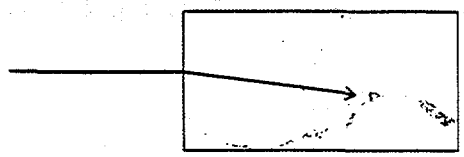
protection of coastal resources. Certainly, there is seldom sufficient information available to examine all aspects of a project's cumulative impacts on coastal resources and uses.

Interestingly, over 40 respondents indicated as obstacles all of the choices except for "inadequate experience to address cumulative impacts" and "limited authority to address cumulative impacts due to land ownership" which received 36 and 30 responses respectively. The largest differences between agency and district responses was that districts did not perceive lack of support, insufficient time, insufficient funds, or the lack of a definition as obstacles at the same rate as agency respondents did.

Overall, results to this question do not indicate that cumulative impacts are being successfully addressed. On every one of the obstacles, over 40% of the respondents indicated that they face that obstacle. In fact, on eight of the nine obstacles, over 50% of the respondents indicated that they face that obstacle. While no attempt was made to have the respondents rank the obstacles or to assess their severity, the fact that so many agency and district respondents perceive such a high number of obstacles is not conducive to successfully addressing cumulative impacts.

Cumulative Impacts in Brief

Site: Ship Creek, Anchorage



Cumulative Impact: Ship Creek, like many of the Anchorage area streams, is being affected by cumulative impacts. In Ship Creek the impacts from non-point source pollution running off military bases, golf courses, junkyards, and railroad property is impacting aquatic life, recreation, and drinking water.

Steps to Address it: It was determined that the site needed attention after Elmendorf Air Force Base and a junkyard were listed as superfund sites. The Resource Conservation and Recovery Act (RCRA) required analysis and assessment. Also, the fish hatchery had an increase in plant life, indicating nutrient-rich water. A "Best Technical Advisory Group" was formed to address the issues, and the creek was listed as an impaired water body. The most effective steps taken to control the problem have been education—simply making responsible parties aware that their actions affect creek resources.

Notable Features: This process highlights some of the difficulty of working with a multitude of government entities in a complex, bureaucratic environment. The time frames for action under the various laws at the federal level are extremely varied and often conflict. For example, "superfund sites under RCRA are on a 5 to 10 year schedule and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) schedule is too short. It is difficult to get federal agencies together because their timeframes conflict."

4.6 Techniques Used

Question 11a: Respondents were asked a closed question that required them to indicate whether or not they used certain techniques to address problems associated with cumulative impacts. Overall, the most used techniques were "apply your own professional judgment" and "hold discussions internally." The techniques used by the largest number of district respondents are "hold discussions internally" and "apply permit review techniques," while the techniques used by the largest number of agencies are "hold discussions internally" and "draw on other agencies' activities, information or staff knowledge."

By looking at the respondents' techniques identified by Questions 4 through 8 and Question 11 on the survey (see section 4.3) it is possible to get a better picture of how

techniques are used to address cumulative impacts. Section 4.4 indicates the techniques used for addressing cumulative impacts. Figure 4.3 depicts the number of people using that method.

4.7 Successful and Unsuccessful Methods and Techniques

Question 11b: Respondents were asked to determine the techniques most successful in addressing cumulative impacts. Overall, the respondents indicated that the most successful process is an effective permit process. For this process to be effective, it must provide communication and coordination between agencies, involve the applicant in a cooperative learning process upfront, and be based on a sound plan with enforceable policies. Enforceable permit stipulations should be attached to the permit, and those stipulations should ensure that the activity will avoid, minimize, or mitigate the cumulative impact. Finally, the project must be monitored and the stipulations enforced through field investigation. This process, while viewed as the most effective, is not always accomplished because of the obstacles mentioned in section 4.5.

The following is a list of the most successful techniques used by respondents, roughly ranked by frequency of response from a coding of Question 11b. These techniques were seldom mentioned as working well in isolation, but in conjunction with the other techniques in the process described above, they are successful.

For each of these techniques, ten or more respondents indicated they are successful.

- Enforceable permit stipulations and permitting with intent to mitigate or limit impact
- Coordination with applicant & agency internal discussions
- Enforceable policies/good planning
- Field presence
- Professional judgment
- Monitoring
- Enforcement

The following is the remainder of the techniques mentioned by respondents. Each of these techniques received mention by less than five respondents.

- Public education
- Legal action
- Modification of policy
- Search of files
- Limited access
- None
- Cartographic techniques

- Special studies
- Environmental indicators
- NEPA studies
- Local knowledge
- Outside consultants

To review all responses regarding successful techniques, see Appendix C, Question 11b.

In question 11c respondents were asked which techniques had been unsuccessful. The responses to this question resulted not so much in a list of techniques that do not work but rather in cautions or tips for properly using certain techniques and criticisms. Table 4-1 highlights respondents' criticisms and tips. Many respondents indicated that all techniques were useful, indicating things like: "None were unsuccessful—they are all useful in their own way," or "They all work to some extent." Respondents noted that if improperly used or applied they could be ineffective or even backfire. The following table summarizes the comments on how techniques had been unsuccessful for respondent's efforts to address cumulative impacts. These limitations could be addressed in the next steps of the state's cumulative impact strategy.

Cumulative Impacts in Brief

Site: Comstock Road area, Haines

Cumulative Impact: Increasing residential development and lack of compliance with on-site wastewater regulations have resulted in failing septic systems and increased concentrations of fecal coliform bacterial. Sawmill Creek, an anadromous creek. Increased concentrations of fecal coliform bacteria Development outside city limits is not under city jurisdiction.

Steps to Address it: Water quality sampling and monitoring identified the problems. The developments are outside city limits, therefore not under city jurisdiction. The city hired a consultant to write the "Sawmill Creek Management Plan", using ACMP funds. The plan maps and describes sensitive areas and recommends measures to prevent further cumulative impacts. Additional educational efforts have reached property owners and other users as to the valuable resources and permit procedures that need to be followed.

Notable Features:. The special management plan approach has been effective in addressing an area outside city jurisdiction. No significant illegal activity has occurred in the area, which is presumed to be due to the raised public awareness from the planning and education efforts.

Table 4-1
How Techniques Have Been Unsuccessful (Question 11c)

Technique	Criticism
Enforceable policies	Policies are not enforceable; establishment takes too long; establishing enforceable policies is ineffective because the lead planning agency for the state has become politicized—they've forgotten public trust doctrine in public planning process; the regulatory process only works if there is follow through. Cannot tell whether or not the permit process works, because of lack of field monitoring and site information; limited annual travel budget and too many remote sites to visit.
Enforcement	Avoid hard-core enforcement—try to work with people before problems develop; starting off immediately with enforcement doesn't work—it is too confrontational; to have good enforcement you need someone with more of a state trooper mentality; enforcement is difficult, have no environmental 'cop'; the regulatory process only works if there is follow through.
Change Policy	Policy changes not used; Policy changes don't work well except for identifying potential cumulative impacts; do not work until some issue is driving the change; when regulations or requirements are lacking, protection against cumulative impacts is less effective/successful.
Agency coordination	Going to other agencies for cooperation because they view an AMSA as a preservation document where it should allow "balanced development." The institutional mind set is making it more difficult than it needs to be. Communications with other agencies - because of different agendas, politics, etc.; The agency reviews aren't always consistent (interpretations of regulations are different). Getting local government involved because of local politics; Relying on agencies doesn't work because it depends on how interested that particular agency is in addressing the cumulative impacts; Internal discussions not used like they could be to address cumulative impacts; relying on agencies doesn't work because they do not know how to address cumulative impacts; Using agency information is not always useful because it is a data "dump" with no analysis/conclusions; efforts to be big brother, know what's best for you is contrary to attitudes of Alaskans; also not protecting fish and wildlife resources even when the policies are stated in their own DNR plans; with the Corps' 404 program, there is no successful protocol for evaluating CI on watershed basis, this led to the national policy on "no net loss" of wetlands and the outcome has not been good; success of techniques has not been determined yet, for example: one agency has placed a moratorium on an activity in order to study it but no results are out after 3-4 years; techniques to weigh [consider] different values are not effective, because of the subjective judgment involved - and fights - about what outcome is better for most people (this occurs when some people who depend on subsistence vs. others who are big business interests have a difference in values).
Education	After-the-fact education ("re-active education") - once opinion on a project is formed it is difficult to change people's minds; Education [about the need to deal with cumulative impacts] has been slow to develop, once people understand, they want to do something about them, but until then it is just confusion; Education [about the need to deal with CIs] has been slow, but until then it is just confusion.
Federal Planning	Forest Service planning - because they don't take into consideration local comment; with the Corps' 404 program, there is no successful protocol for evaluating cumulative impacts on watershed basis, this led to the national policy on "no net loss" of wetlands and the outcome has not been good.
Monitoring	In monitoring timber harvest techniques operators "perceived" the monitoring as an evaluation of staff; Monitoring and field presence only work well if you have the staffing and funding; Monitoring information does not always include analysis and does not always draw a consistent "picture" from which to evaluate changes over time; Lack of analysis and "dumping" data into agency files does not constitute monitoring; Monitoring and enforcement follow-through is weak, as with so many agency programs, due to limited staff resources; Front end work is emphasized -planning, permitting, but don't have follow through; There are things we wish we were doing but don't have the funds for (e.g. monitoring).
Planning	Long-term language and interpretation is not always effective or specific enough.
Special Studies	Study results will be used or ignored as it suits the various public constituencies; Receiving a 2 inch thick document from somewhere else is not helpful; statistics / hard evidence are not conclusive proof that a concern is 'legitimate'.
NEPA	NEPA over complicated and based on inaccurate models, enforced based on philosophy not science, too expensive; NEPA is only valuable in early stages.
Consistency Reviews	Consistency reviews do not work; It has been ineffective to try to find a project inconsistent based on an enforceable policy regarding CIs, because districts or other entities overturned finding; It involves other problems like which agency should carry a requirement; the elevation process in the ACMP is not effective due to the prejudices of the people holding those positions - inevitably there will be a failure in the process, and elevation also leads to lawsuits; when an applicant doesn't want to cooperate it is hard, because unless

Technique	Criticism
	the political will is there, we can't use the rest of the 'control' tools; also we try to treat everyone the same, but it is not possible due to political directives to be more lenient to some.
Field Presence	Because there is not enough staff; conducting field surveys and measuring impacts depend on staffing and funding; limited annual travel budget and too many remote sites to visit.
Cartographic Techniques	Mapping techniques are limited in availability.
Establishing Thresholds	Thresholds and standards difficult to enforce; good tools are not available to make a "cut" in incremental residential development activities; the Borough Assembly did not implement techniques proposed to them by the planning staff, therefore there are still limitations on local regulatory authorities.
Permit Stipulations	Stipulations only work well if you monitor compliance. Good tools are not available to make a "cut" in incremental residential development activities; assembly did not implement techniques proposed to them by planning staff on a conditional use permit, therefore local regulatory authorities are still limited.
Mitigation	Being forced into developing mitigation when we have no information - the mitigation ends up being way off target, with good information and specific studies we would be able to suggest good, effective mitigation.
Limiting Access	Limiting access and thresholds would be effective if we did it but the agency mitigates and minimizes rather than stopping cumulative impacts, thus the impacts are allowed and still adding up.

Respondents also made general comments regarding their inability to spend time on addressing cumulative impacts, and therefore they were not prepared to comment on which techniques were ineffective. Similarly, comments were made that it is difficult to know whether a particular technique is effective, as there is inadequate time or resources to find out whether the technique worked.

5.0 Recommendations

Introduction

Chapter 3.0 put forth a set of general criteria necessary to successfully address cumulative impacts and described how those criteria were incorporated into the survey. Chapter 4.0 presented findings from the interviews with respondents and gauged the adequacy of the methods being used to address cumulative impacts. In that chapter, analysis indicated that respondents clearly feel that there are cumulative impact problems occuring around the state, and that efforts to address them are not working well. This chapter discusses recommendations based on the findings from Chapter 4.0 to remedy identified inadequacies in how agencies and districts are addressing cumulative impacts.

The recommendations discussed in this chapter are to:

- Establish a top-level commitment to addressing cumulative impacts in Alaska, supported by practitioners and the public statewide;
- Pursue more explicit authority to address cumulative impacts in legislation, regulations, and/or policy;
- Develop more formalized implementation guidance based on established authorities;
- Establish a cumulative impact definition in regulation;
- Provide training for those responsible for addressing cumulative impacts, particularly small coastal districts, to assist them in identifying, considering and controlling cumulative impacts;
- Provide adequate resources (including funding and dedicated staff time);
- Develop a public education program; and
- Develop better sources of information and information sharing among agencies and districts.

Each of these recommendations is now discussed in turn.

Recommendation: Establish a top-level commitment to addressing cumulative impacts in Alaska, supported by practitioners and the public statewide.

All the recommendations in this chapter would be best served if preceded by a commitment at the top-level of state government and among coastal policy makers in the state (for example, the Coastal Policy Council) that cumulative impacts are an important public policy issue for Alaska and will be addressed. With such a commitment, many other steps and commitments are possible statewide. Without such a commitment, other steps and commitments may be made, but without firm legal standing, procedural support, or longevity. Such a top-level commitment must be based on widespread support from practitioners, and from their public constituents. Numerous repondents commented that

cumulative impact problems are not well recognized by top-level officials in Alaska. Agency and district staff recognize the severity of problems, but are not supported by their managers in addressing the problems. Respondents recommend that the State should make it a priority to address cumulative impacts. For the State to make this commitment however, district respondents in particular believe local and regional flexibility should be retained, rather than a simple centralized state approach. This is consistent with the local emphasis in the ACMP overall.

What Respondents Recommend

Commitment - Respondents indicated that State and coastal policy makers need to admit that there is a cumulative impact problem and to make solving that problem a priority. The agency staff know cumulative impacts are occurring but to address them they need more push from higher levels. Among the needs identified by respondents are:

- A mandate
- Better mission
- Defined support

In fact it was even suggested that agencies with the responsibility to address cumulative impacts are told not to do it from upper levels of management.

To develop widespread support, the leaders of the current State Cumulative Impacts strategy need to continue efforts to keep cumulative impacts in the eye of the public, the practitioners and the policy makers, with focus and concrete results. The "cumulative impact problem" and its consequences and costs to the state must be clear, or else no changes will come about.

The state has already shown the federal government that cumulative impacts are a significant public policy issue deserving of study and action, by winning Section 309 funding from the federal Office of Coastal Resource Management. Now, the results of this survey study could be forwarded to the Governor, agency commissioners and members of the Coastal Policy Council for their consideration and action. Another technique that could be effective in establishing top-level commitment would be to have agency heads, members of the Coastal Policy Council, legislators, and other coastal policy makers involved in the next phase of cumulative impact study in Alaska, the "Group Discussions" Section 309 project. The group discussions forum would provide an excellent opportunity for policy makers to grasp the problem of cumulative impacts in Alaska.

An effective structure to addressing the programmatic problems with cumulative impacts might be strategic planning. Strategic planning is a process that can help an organization create and coalesce around a future vision, and devise strategies for implementing that vision. Among the benefits that can result from a strategic planning process are to clarify future direction, create a rational and justifiable basis for decision-making, making decisions and policy across levels and functions in an organization, solving major organizational problems, and most importantly building consensus. The first step in a strategic planning process is, however, to get agreement on the need to plan. Thus, two recommended goals of the Group Discussion project should be to develop an upper-level acknowledgment of cumulative impacts as a statewide problem and get a commitment to

embark on a strategic planning process for developing a unified approach to addressing cumulative impacts.

Recommendation: Pursue more explicit authority to address cumulative impacts in legislation, regulations, and / or policy.

One of the most important components to successfully addressing cumulative impacts is strong, clear authority or direction. Survey findings indicate that most respondents either are unaware of any direction or that the direction is weak. In fact, several respondents indicated that they have been instructed not to look at cumulative impacts. As a result there is not a widespread concerted effort made to identify, consider, or control cumulative impacts.

Until there is a clear authority at the state and district levels, steps to address cumulative impacts will remain ad hoc.

What Respondents Recommend

Authority - In general, respondents recommended that better authority for addressing cumulative impacts be developed. However, there was less agreement as to what form of authority would work best. Among the means for strengthening cumulative impact authorities was:

- **Statutes and Regulations** - Respondents recommended everything from new statues and regulations to modifying the existing regulations, to simply enforcing what is currently in place. Generally, respondents recognized the need to have regulations that are culturally and environmentally sensitive because blanket regulations do not fit every place.
- **Policies** - Many respondents indicated the need for a clear policy regarding cumulative impacts from their department indicating that cumulative impacts will be addressed. In addition, policies in coastal programs need to be enforceable.
- **Enforcement** - Respondents indicated that policies and regulations had to be enforceable and that enforcement capabilities would be required;

The types of statutes, regulations, and policy authorities that were suggested to be used or strengthened ran the gambit from ACMP statutes and regulations, to Title 16, to greater use of local district plans, and local government with planning and zoning authorities

Opinions vary on the type and source of authority or direction needed. Some respondents indicated that they would like to see strengthened legislation, others indicated current legislation would work with strengthened regulation, others indicated that participation should be voluntary. While the ACMP program regulations do indicate that cumulative impacts are among the "uses of direct and significant impact" which are to be addressed by the program, this is not widely recognized by respondents. Furthermore, there is little else that respondents are aware of which provides them the authority to take adequate steps in addressing cumulative impacts.

What is clear is that until agencies and districts are clearly directed to address cumulative impacts, efforts will vary greatly, and steps taken will be adequate only in isolated cases.

Recommendation: Develop more formalized implementation guidance based on established authorities.

Very little to no guidance has been provided to this sample of agencies and districts on how to address cumulative impacts. Thus, even if there is strong state direction, there is little to guide practitioners in steps to address a cumulative impact. In the absence of legislation or regulation specific to addressing cumulative impacts, internal guidance could be developed under the existing authorities. This recommendation could be implemented by the Coastal Policy Council, given the Council's broad representation of agencies, districts and the public. Such guidance should be flexible in its application and usable by a wide range of practitioners. Establishing checklists, thresholds, and procedures for cooperative approaches to addressing the impacts are some of the suggestions made by respondents. The methods that people currently use to identify cumulative impacts are very informal, mostly relying on public complaints or professional judgment. While these techniques may be effective in initially identifying potential cumulative impacts, informal methods are not as effective in considering or controlling cumulative impacts. More formal procedures should be developed and adopted for these steps. Specific procedures and tools were proposed in the report entitled, *Cumulative and Secondary Impacts and the Alaska Coastal Management Program* (DNR, 1994). For example, in the recommendation chapter a "Methodology for Addressing Cumulative and Secondary Impacts" is presented. This methodology presents a structured series of questions for evaluating, making decisions about, and implementing controls for cumulative impacts. Elements from this methodology could be adopted to provide structure to ways cumulative impacts are currently addressed. The recommendations from this report should be reviewed to determine which ones would be feasible for implementation once the commitment and authority recommendations above have been met.

What Respondents Recommend

Guidance - Respondents overwhelming supported the idea of specific guidance on how to address cumulative impacts. There are several technical questions frequently cited by respondents as areas in which they required additional guidance or policy direction. Many respondents indicated a format for the guidance. In general it was recognized that a process or procedure was needed, such as a step-by-step process or checklist. Respondents recommended that guidelines be procedural and not force conclusions and that they be flexible to local conditions. Among questions on which guidance is needed are:

- What should be measured?
- What cumulative impacts are occurring?
- How far back should you look to start adding impacts?
- How do you avoid cumulative impacts first?
- What are the standards on the minimum retention for habitat?
- What should be key elements to look for?
- At what point (threshold) does an activity or use create a cumulative impact?
- At what point does a cumulative impact become significant?
- Where do you stop adding things in (i.e. within what geographic area should impacts be added). For example, do you consider the tributary of the stream the entire drainage or the entire ocean system).

One issue that needs further resolution is the degree to which guidance should be consistent statewide in order to effectively address cumulative impacts. Consistent guidance may be advantageous from a legal liability standpoint, but may not be practical

for implementation. Respondents called for clearer guidance, but also acknowledged the difficulty of developing guidance that would be workable statewide. There were comments on the merits of consistency, as well as the importance of local interpretation and flexibility. In addition, as was indicated in Section 4.2, the more exact the guidance was on providing a specific process or standards, the more successful it was. Thus, State standards may be necessary at a general level to ensure consistency, but specifics may best be left to local flexibility.

Another thorny issue in addressing cumulative impacts is the concept of thresholds. Many respondents would like thresholds to be in place to guide their evaluation and decision making about how much impact is too much. A threshold can be an established limit above which additional impact is unacceptable, or acceptable only under certain conditions. Thresholds involve at least two difficult issues: measurement of change and standards for the results of change. Certain impacts, such as waste discharges from a pipe, are more measurable than others, such as how subsistence uses are affected by a new mining operation. But established standards for degrees of acceptable change are difficult and uncommon in both cases. Thresholds are not simply technical; they need to be adopted with adequate public involvement. With many issues, thresholds should not be developed solely at the state level. They may best be developed on a local, district or watershed basis. Amendments to coastal district plans could be a logical outcome of the development and adoption of thresholds. Further work is needed on these issues.

A current 309 project is funding a study with the Sitka Coastal District to research and establish coastal indicators that would lead to a benchmark system. Under this system each indicator would have a specific measurement with short-term and long-term goals for each indicator. Use of coastal indicators with benchmarks for improvment may prove to be an effective means for dealing with thresholds.

Recommendation: Establish a cumulative impact definition in regulation.

A definition is an essential component to any legislation, regulation, policy direction, or guidance. It is important that all practitioners be familiar with the definition and are comfortable using it. This is not to say that criteria for determining when a cumulative impact is reached should be identical throughout the state, because there are some good arguments that regional or local conditions should be weighted heavily. One respondent urged that the agencies should also be allowed different definitions, rather than be forced into a homogeneous state definition.

What Respondents Recommend

Definition - Respondents indicated the need to have a working (user friendly) definition of what cumulative impacts are. How this definition would be established varied. Some recommended it be in regulation, others indicated that districts need their own definitions. Some respondents suggested that the definitiion be measurable, have standards, and specific criteria on which to judge impacts.

A common regulatory definition would, however, provide a central framework for all

practitioners to work with. Survey findings indicate that most practitioners (64%) have a good working knowledge of what cumulative impacts are. However, until all practitioners understand what they are and can apply the definition, adequate steps are not likely be employed statewide in addressing cumulative impacts.

Recommendation: Provide training for those responsible for addressing cumulative impacts, particularly small coastal districts, to assist them in identifying, considering and controlling cumulative impacts.

What Respondents Recommend
Training Respondents indicated the need for specific training on evaluation and assessment of cumulative impacts. Some of the suggestions included: • "Rainbow" type training; • A one day training or work session in conjunction with the annual conference; • Joint training for state and federal agencies; • Training out in the districts to educate local leaders on the regulations.

Identifying, considering and controlling cumulative impacts is, in many cases very technical political. To be adequately conducting the steps in addressing cumulative impacts will require training. Particularly in those interviews in which the respondent did not have a working definition of cumulative impacts, it was clear that training was needed. Moreover, in smaller coastal districts without a full-time planner, those implementing ACMP regulations are often city clerks, city managers, or mayors, people without formal training in environmental, economic, social, or cultural assessment. Providing these practitioners with working skills in addressing cumulative impacts is necessary for them to adequately employ effective methods.

Recommendation: Provide adequate resources, including funding and dedicated staff time.

To expect steps in addressing cumulative impacts to be successful will require adequate support. But not simply political support in the form of new legislation and regulations. The political support must be backed up with the resources, such as staff, staff time, and funding necessary to adequately address cumulative impacts. Survey findings clearly indicate that staff time and funding are currently inadequate for agencies and districts to address cumulative impacts. This lack of resources devoted to cumulative impacts indicates that adequate steps are not being taken. Moreover, any additional responsibilities placed on agency personnel or local coastal districts will have to be adequately funded in order to have any real hope that adequate steps will be taken to address cumulative impacts.

Due to scarce resources at the state and local levels there is a need to identify additional resources and cost-effective techniques. It is difficult to identify such resources or say what is cost-effective until it is clear what has to be done (that is, until there is a commitment, authority, and guidance for practitioners to follow). Most of the recommendations put forth in this report are cost-efffective strategies for getting cumulative impacts to be addressed and for improving the way they are addressed. While

it may be cost-effect for the State to enact these recommendations, once they enacted State and district practitioners will be required to do more than they currently are. It will not be possible to go from not addressing cumulative impacts to addressing them without incurring costs. Some cost-effective techniques or methods include photo documentation of change over time in a given site, and requiring specific, documented information necessary to address cumulative impacts to be supplied by applicants during the permit process. Examples of the kinds of information that could be supplied by applicants include accurate mapping, resource surveys, and a site plan.

Respondents were not asked specifically where additional funding should come from, or which techniques are cost effective, but several suggestions were made. According to respondents, funding for cumulative impacts in the future could be decentralized, spent "closer to the problem sites" (rather than on statewide studies,), and on local environmental assessment. Permit application fees could be used as a means to pay for cumulative impact assessment.

What Respondents Recommend

- **Resources**: Having adequate resources to address cumulative impacts was identified as an important recommendation. As could be expected, funding was one of the most needed resources. Essentially, respondents indicated they are just getting by now, to do anything more with cumulative impact will require additional funding. Many of the comments can be characterized by this statement by one of the respondents: "Cumulative impacts are important but any new regulations must take into account limited staff and time. The resources mentioned as most needed include:
  - Time
  - Staff
  - Money
  - Better tools

Many respondents had very specific recommendations regarding funding over and above simply having more. Some of the recommendations include the following.

- Need ACMP grant funding to do own environmental studies in the region.
- Money should be spent closer to the problem sites.
- Small communities, can barely afford the basics much less "extras" like studies or investigations.
- Can't expect districts to do all of this work, especially with budget cuts.
- Use fees to increase funding to fund more 401 certified staffers.
- Would like money to hire local environmental monitors.
- Funding so communities could obtain the professional expertise or technical assistance they need.
- Funding for enforcement.
- Project proponents should pay for the cumulative impact assessment work.

Recommendation: Develop a public education program

The issues surrounding cumulative impacts require value judgments. Often what is an unacceptable impact to one is not necessarily an impact to another. Causing, or exacerbating this problem is the fact that cumulative impacts are often not readily apparent, are difficult to measure, or are based on technical assessments which are difficult

What Respondents Recommend

• **Public education:** Several respondents suggested that public education was needed. Because it is often difficult to determine when a serices of impacts becomes a cumulative impact and, in cases where determination involve a value judgement, better public education is needed to make the science and decision making process more understandable. It was suggested that better public education can help to lessen the controversy that can be involved in addressing cumulative impacts. Among the recommendations and considerations to keep in mind for public education are:

- Better education is needed for people to see successes not just the failures;
- People need to have an open mind regarding cumulative impacts because they are dependent on the person and their philosophy - thus feelings shape the cumulative impact discussion;
- The shortfall is that coastal districts are not realizing that cumulative impacts exist - in the search for economic development cumulative impacts have been ignored;
- The Kenai River 309 project tried to address all issues then groups either warped or ignored the findings.

to understand or in dispute. Thus, cumulative impact issues can be either very divisive, not accepted by lay people, or must be over-studied at great expense to "prove" that there is a problem. Public education and citizen participation are important tools which can be effectively used to foster agreement on an issue. By providing all potentially affected interests with information on a cumulative impact, its potential costs and potential solutions, appropriate options can be more easily selected and accepted.

Recommendation: Develop better sources of information and information sharing among agencies and districts.

Many respondents indicated that lack of information is frequently an obstacle in their work on cumulative impacts. If this is to be remedied, better sources of information, improved organization of information, and improved information sharing between agencies and local jurisdictions is needed. Examples of information include mapping of impacted areas, tracking of permits, and access to site/resource information from other agencies in the affected area.

In regard to better sources, information needs to be more site-specific, more scientific where possible, and baseline or historical information is needed. Several respondents called for recognition of local knowledge, which is so important in areas where local knowledge is much more abundant (and often more highly valued) than is scientific assessment.

To improve the organization of information, watersheds or river systems as management units make more sense in some locations, as opposed to political jurisdictions. Also, standardized documentation systems used over the long-term would improve the ease of adding or using information. Mapping of impacts makes sense to increase the utility of site-specific information. Permitted activities and their impacts should be documented and mapped.

To improve access to information, agency databases could be more fully utilized. Coordination between agencies and districts could be increased to improve access to and use of agency databases. One way information and expertise could be shared better would be to consolidate the number of required permits into one which would require multi-agency review. Another method would be to require permit reporting to a coordinating agency such as DGC. The coordinating agency could track, compile, and map the information. This technique is successfully used in Oregon to gauge the cumulative effects of each individual county's land use permitting. Each county is required to file a yearly report of all land use permits to the state planning agency. The planning agency compiles the information and issues a report used to monitor the cumulative change of land use permitting by all the counties on the state as a whole.

What Respondents Recommend

Information - Many respondents recommended the need for better more complete information in addressing cumulative impacts. The following list indicates some of the information needed:

- Site histories - to learn what has occurred on the ground and to determine what happens incrementally;
- Data (particularly in communities);
- Baseline data;
- Monitoring data;
- Practical information (in-the-field knowledge);
- Need information on human carrying capacity, resource carrying capacity;
- Specific studies, in-depth studies in certain areas;
- Recognize experiential local knowledge and incorporate it into decisions;
- Site-specific information;
- Use agency files and incorporate information into decision-making process;
- Need a dynamic data collection system;
- Information must gain ownership from the user groups and local boards;
- Access to other agencies successes and failures in addressing CI (information from other agencies);
- Must use the data and there should be time to let it be absorbed and built on over years to see changes;
- A mapping system (kept up to date);
- Must have more than academic information on cumulative impacts in order for policy-makers to use it - for real movement from policy makers, must put the information in a form that they can use.
- Need more work done on subtle indicators of biological stress (such as enzyme changes).

Summary of Recommendations

Several of the recommendations advanced here have also been identified by at least two previous reports issued on cumulative impacts (and mentioned in Chapter 2.0): *Cumulative and Secondary Impacts and the Alaska Coastal Management Program* (DNR, 1994) and *Regulation of Cumulative and Secondary Impacts in Alaska* (DGC, 1993)the DNR report and the DGC report. Table 5.1 shows the recommendations common to these sources.

Table 5.1
Recommendations on Cumulative Impacts from Recent Reports

Recommendation	HDR Survey Analysis	Survey Respondents	DNR Report	DGC Report
Commitment, Authority & Direction	✓	✓	✓	✓
Establish Definition	✓	✓	✓	✓
Develop Guidance	✓	✓	✓	✓
Provide Training	✓	✓		
Provide Adequate Resources	✓	✓	✓	
Develop Public Education	✓	✓		
Improve Information	✓	✓	✓	✓

The above general recommendations have been developed independently from one another, using different approaches than the survey approach used for this project. While the general recommendations are somewhat consistent, many discreet issues remain to be resolved, such as whether authority should be strengthened via statutes, regulation and / or policy, and how to go about establishing thresholds. Such questions should be dealt with in the group discussion project of Alaska's Strategy on cumulative impacts, with a wide audience of participants engaged. The current status of cumulative impacts practices in Alaska has been investigated. If the State chooses to advance a program for addressing cumulative impacts in Alaska, the next steps can now focus on concrete decisions, actions, and tools for successful implementation.

The recommendations in this chapter, and the findings presented in Chapter 4.0 form a framework for addressing cumulative impacts at the state and coastal district levels. At present, there is no concerted program to address cumulative impacts in Alaska. To establish such a program, firm commitment from top-level officials (the Governor's Office, State agency heads, and the Coastal Policy Council) would be needed and should be based on broad-based support among practitioners and their local publics. Support for such an effort would be facilitated through strategic planning and public education. Then authorities would need to be more clearly delineated, such that legal and procedural support would be established for all practitioners to use. Effective authority relies upon a recognized definition of cumulative impacts and guidance to carry out appropriate steps. To carry out these steps, practitioners would need more training; adequate resources and staffing; the ability to educate the public on the importance of cumulative impact problems, consequences and solutions; and better information sources. Until these programmatic elements are corrected, efforts to address and control cumulative impacts will continue as they are now, largely informal, ad hoc, and rarely effective, and the list of cumultively impacted sites will continue to grow.

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Appendix A

Introductory Letter From DGC to all Selected Respondents

TONY KNOWLES, GOVERNOR

OFFICE OF THE GOVERNOR

OFFICE OF MANAGEMENT AND BUDGET
DIVISION OF GOVERNMENTAL COORDINATION

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☐ PIPELINE COORDINATOR'S OFFICE
411 WEST 4TH AVENUE, SUITE 2C
ANCHORAGE, ALASKA 99501-2343
PH: (907) 278-8594/FAX: (907) 272-0690

DATE

FIELD(first name) FIELD(last name)
FIELD(full address)
FIELD(city/state/zip)

FIELD(Salutation)

We request your participation in an interagency project concerning cumulative impacts of growth and development. This project, funded with a federal grant administered through the Alaska Coastal Management Program, is managed by a seven-person team. Team members represent the Division of Governmental Coordination; the State Departments of Natural Resources, Fish & Game, Environmental Conservation, and Commerce and Economic Development; the Kodiak Island Borough coastal management program; and the Bristol Bay Coastal Resource Service Area. A list of the team members is enclosed with this letter.

Simply stated, cumulative impacts are the effects of activities and uses that persist over time. Cumulative impacts may be of a social, economic or environmental nature.

The primary purpose of the project is to determine where cumulative impacts occur and how State agencies and coastal districts address them. An evaluation committee selected HDR Engineering, Inc. of Anchorage to conduct telephone interviews to characterize current practices regarding cumulative impacts in Alaska. A representative of this firm will contact you during February or March to learn more about your experience with cumulative impacts. The interview will take between 20 and 60 minutes.

During the interview, the staff at HDR Engineering, Inc. will ask you a number of questions about the following topics:

- general information about you and your authorities;
- site-specific information about cumulative impacts in your area; and
- methods used to identify, consider and control cumulative impacts.

HDR will use information from the interview to write a report, but responses will not be attributed to specific individuals. All respondents will be sent a copy of the draft report of project findings for review and comment.

Thank you in advance for your participation in this important project. If you have any questions regarding this project, please contact me by calling 465-8792.

Sincerely,

Glenn Gray
Project Leader

Appendix B

Survey Instrument (blank)

Cumulative Impacts in Alaska
Survey Instrument

Last Name:

Phone:
Fax:

Respondent Code:

First Name:

Program Areas:

Agency or District / Division:

Address:

Send Draft Report?
_____Yes _____No

Address confirmed?
_____Yes _____No

Attempt 1 Date:

Scheduled Interview Date:

Scheduled Interview Time:

Attempt 2 Date:

Attempt 3 Date:

Interview Date:

Actual Start Time:

End Time:

Interviewer:

Minutes to Complete:

Notes:

Respondent Code:

Part A: The Respondent's Frame of Reference and Authorities

1. What does the term "cumulative impact" mean to you?

2. Is your coastal district or agency directed by statute, regulation, enforceable policies, or by other direction to identify, consider and/or control cumulative impacts?

_____ Yes _____ No _____ Not sure

2b. [If Yes] Could you please identify the source of direction, and what you are directed to do?

Source of Direction	What are you directed to do?

Part B: Cumulative Impact Sites in the Respondent's Area.

For this survey, we are using a general concept of cumulative impact. When you respond to questions, please think of your experience in light of this general idea rather than a strict definition. I'd like to read it to you, then ask you whether you can think of sites in your area where a cumulative impact has occurred.

A cumulative impact is the effect of an action when added to the effect of other past, present, and reasonably foreseeable future actions, regardless of who undertakes the various actions. A cumulative impact can result from individually minor but collectively significant actions taking place over time. In other words, several minor effects add together to cause a more severe impact. A cumulative impact can be environmental, economic, social or cultural in nature. The impact can be from a single source or from multiple sources added together or added together over time. For this survey, cumulative impacts are presumed to be adverse effects. Would it be helpful for me to read this concept again?

So in general terms,

3a. Are there geographic sites in your jurisdiction /area of concern where you believe uses and activities are causing environmental, economic, social, or cultural effects to add up over time?

_____Yes _____ No _____Don't Know

3b. [If Yes] Could you please name the geographic areas or sites (be as specific as possible) being affected? And for each site, please note environmental resources (such as wetlands) or economic, social or cultural uses (such as commercial or subsistence fisheries, or tourism) that are affected. Also, what seems to be causing the impacts?

Area / Site	Resources or uses affected	Causes of the impacts [If it is unclear what causes the impact to be cumulative, ask them.]

Area / Site	Resources or uses affected	Causes of the impacts [If it is unclear what causes the impact to be cumulative, ask them.]

4. Could you choose the site or situation you know the most about, for a few follow up questions?

Site/ Situation:_____

4a. How was it determined that impacts were adding up and causing problems over time?

4b. How was it determined that problems needed attention?

4c. What steps have you taken to address the cumulative problems, if any?

4d. What steps have been effective and why?

4e. What steps have not been effective and why not?

Part C: Process Used to Identify, Consider, and Control Cumulative Impacts.

Next, I would like to ask you about any steps you take to identify, consider, and control cumulative impacts. In other words, how do you typically learn that cumulative impacts are occurring, how do you decide there is a problem and what to do about it, and then what actions do you take or what techniques you have used to control the impacts from getting worse? Again, a cumulative impact could affect environmental, economic, social or cultural resources or uses. The impact can be from a single source or from multiple sources added together or added together over time. So,

5. Is the process you have just described for the _____(impacted site) very typical of what you do? [If yes, skip to 9] If not, I want to ask you about your more common practices.

6. Do you take particular steps or use certain techniques to determine whether a cumulative impact is occurring or has the potential to occur? If so, what are these steps or techniques?

7. What kind of process or techniques, if any, do you use to consider cumulative impacts? In other words, after you know a cumulative impact is occurring or is likely to occur, what do you do to decide if that cumulative impact is significant and needs attention? And how do you determine what attention it needs?

8. What kinds of actions have you used to control or limit cumulative impacts? In other words, after it has been determined that a cumulative impact is occurring and it needs attention what do you do to remedy the impact?

9. What obstacles or difficulties, if any, do you face in identifying, considering or controlling cumulative impacts?

10. Do you face any of the <u>following</u> obstacles in identifying, considering, and controlling cumulative impacts?

_____ inadequate direction, guidance or tools with which to address cumulative impacts
_____ lack of political or institutional support for doing so
_____ insufficient time to pay attention to cumulative impacts
_____ insufficient funds to assess and evaluate cumulative impacts
_____ insufficient site-specific information (such as baseline data) about resources at risk
_____ insufficient information to determine whether a cumulative impact will be significant
_____ inadequate experience to address cumulative impacts
_____ the absence of a definition of "cumulative impacts" established in regulation
_____ limited authority to address cumulative impacts, due to land ownership

_____ Can you think of any other obstacles you face?

11a Next, I would like to read to you a list of techniques which could be used to identify, consider or control cumulative impacts. As I read each technique, please indicate whether you use the technique to address the problems associated with cumulative impacts. [Interviewer should note a number next to each technique used; 1,2,3, etc.]

_____ search files to find out about impacts from past projects in a given area
_____ draw on other agencies' activities, information or staff knowledge
_____ rely on other agencies to address cumulative impacts
_____ apply planning techniques (such as research techniques from land use planning, community planning, master planning, comprehensive planning, or economic development planning)
_____ use NEPA or EIS processes
_____ use permit review techniques or consistency review techniques (such as requests for additional project information)
_____ conduct special studies (such as to monitor ecosystem health)
_____ conduct field surveys
_____ measure an impact against specific environmental standards
_____ assess environmental indicators (such as species or conditions which may change over time)
_____ apply cartographic techniques (such as a Geographic Information System)
_____ apply your own professional judgement
_____ hold discussions internally (at your district or agency)

_____ through planning, establish enforceable policies with the intent to prevent significant adverse cumulative impacts from occurring
_____ establish thresholds or standards beyond which impacts are not allowed
_____ attach enforceable stipulations or mitigation requirements to permits, leases, or licenses
_____ in a consistency review, find a project inconsistent based on an enforceable policy regarding cumulative impacts
_____ limit access to the resources at risk (such as with a lottery or a first-come-first-serve system)
_____ take enforcement actions (issue notices of violation)
_____ monitor site-specific impacts
_____ maintain a field presence to prevent further impacts in the vicinity
_____ based on impacts to date, make a change of policy regarding future impacts

_____ Do you use other techniques to identify, consider or control cumulative impacts?

11b. Of the techniques you just mentioned, which techniques have been the most successful in addressing cumulative impacts, and why?

11c. Which techniques have been unsuccessful in addressing cumulative impacts, and why?

Part D: Closing Information From Respondent

We have a few closing questions about your work background and your outlook.

12a. Have you worked in any positions in which you encountered cumulative impact issues?

_____ Yes _____ No _____Not Sure

[If No or Not Sure, go on to question 13.]

12b. [If Yes] In what context were you employed?, what was your title?, and what were your job duties (such as field work, monitoring, permitting, programming, or policy development)?

Agency	Title	Job duties: field work? monitoring? permitting?, planning? or policy development? etc.

13a. Earlier we asked about statutory and regulatory direction on cumulative impacts. Are you aware of any written internal guidance within your agency or district on how to address cumulative impacts?

_____ Yes _____ No _____ Not sure

13b. [If Yes] What is it, and do you use it?

13c. [If Yes] Has the guidance been useful? Why or why not?

14. What additional guidance or tools, if any, would be useful to you in addressing cumulative impacts?

15. Do you have any closing comments or recommendations regarding how cumulative impacts are - or could be - addressed by state agencies or districts, and if so what are they?

Thank you very much for your time and contributions to this study.

We will write a report based on the 85 interviews we are conducting. Are you interested in seeing a copy of the draft report? If so, it will be sent to you for your review and comment later this spring. _____Yes _____No

[If Yes] I'd like to confirm that we have the correct address for you [read the address on cover sheet and make any corrections].

Thanks again for your time.

Appendix C

Cumulative Impacts in Alaska Survey Instrument and Survey Responses

APPENDIX C
Cumulative Impacts in Alaska Survey Instrument and Survey Responses

Part A: The Respondent's Frame of Reference and Authorities

1. What does the term "cumulative impact" mean to you?

- 45 respondents had a working concept of the term which closely resembled the Council of Environmental Quality definition.
- 25 respondents had a concept of the term which did not resemble the Council of Environmental Quality defintion , or they did not have a concept of the term " cumlative impact".

2. Is your coastal district or agency directed by statute, regulation, enforceable policies, or by other direction to identify, consider and/or control cumulative impacts?

30 Yes 40 No ___Not sure

2b. [If Yes] Could you please identify the source of direction, and what you are directed to do.

Source of Direction	What are you directed to do?
Federal Sources of Direction	
NEPA	Consider cumulative impacts when federally aided projects are proposed; in preparing EA or EIS, consider cumulative impacts
NEPA	Must consider CI but only under EIS review - limited state role
FCZMA	Voluntary direction in Section 6217; discusses CI and Section 309 which provides funds to address CI
Clean Air Act	Sets standards
Clean Water Act	State sometimes uses the water quality regulations
Federal Regulation	Requires feds to look at CI but the state is directed only when a federal project or federal funding is involved
FHWA Policy, NEPA	Evaluate secondary and CI resulting from an action
FHWA Project Development Guidelines, CFR 23, and technical guidance in the form of memoranda from FHWA	Directed to identify cumulative impacts and look at area of impact on economy and socioeconomics (e.g. impacts to rates of growth in a community); directed to characterize cumulative impacts (within guidelines re: quantification) e.g. rates of growth and impacts to infrastructure; directed to characterize positive cumulative impacts; directed to inform units or people of potential impacts

State Sources of Direction	
ADF&G Mitigation Policy	Implicit and explicit direction to look at and consider CI; it is similar to NEPA but not specific to CI, it may, however, result in looking at CI
AS 1605 (840) & (870)	Not explicit regarding CI but does not exclude it either
5 AAC 95	Touches on CI, regulations on special areas
18 AAC 50. (300) & (400)	Application must look at indirect air quality impacts
Through ACMP	Take CI into consideration before approval of a permit
The ABC list	Must look at CI when proposing general concurrence
6 AAC 46.40.210	The term is defined and referenced in the act
ACMP Regulations	Not specific but there are various places where you look at CI
Statute	Land use planning does not specifically require CI consideration but it ends up being part of the process
Forest Practices Act	CI not addressed but there are some general goals and buffer requirements which are somewhat applicable
Regulations adopting management plans for State refuges	To take into account CI when authorizing a special area permit
Regulations 70.010	Water quality (anti-degradation clause)
Legislation allowing aquatic farming	To look at affects of the number of aquatic farms on an area
Aquatic Farm Program Statutes	"Consider" CIs
Policy, but only indirectly	To maintain fish and wildlife (indirectly addresses CI)
Through the permit process	To identify and look at the ability of a facility to handle impacts over time
18 AAC 70 - Mixing zone standards	Address all discharges in combination or separately - one of the only places where CI are alluded to
Memo from former director of DEC	Provides some guidance on how to permit activities on TMDL waterbodies
State Water Quality Standards	Consider cumulative impacts and effect on water quality; e.g. turbidity from 3 separate discharges may add up over time to create impact
Oil Spill Response Regulations	Consider cumulative impacts from industrial wastewater and oil spills that add up over time
6 AAC 75 Spill Response	Pollution prevention and mitigation of all pollution including monitoring and overseeing spill cleanup
Title 41 and Title 46	Consider all pollution prevention/oil spill cleanup
ACMP	Directed to consider cumulative impacts
Title 38	Directed to consider cumulative impacts; not precluded from considering and controlling in the best interest of state
Alaska Constitution	Provides for state agencies to create statutes and regulations to address cumulative impacts
Title 38	Directed to consider cumulative impacts in the management of state lands

State Sources of Direction (continued)	
AAC 11	Provides guidance for how Title 38 is to be interpreted
AS 46.15.080	Requires notice, collection of information, determination regarding impacts of proposed project on public interest; consider impacts to fish and wildlife; effects on economy; effects on health.
Water Quality Regulations	Doesn't say "CI" but gives authority to develop regs
6 AAC 80	In spirit, CI is to be addressed
Section 401 Certification	Must certify that water quality will be maintained (in relation to a fill activity); on a permit-by-permit basis but for large discharges, applicant may be required to monitor whole waterbody
ACMP and regulations	Terms and definitions that "get to" CI
Statutes and Regulations	Requires staff within agencies to look at numerous items and effects on ALL interests (including all people affected); enforcement authorities also
State and local statute	To protect the environment
Local or Coastal District Sources of Direction	
District Program	"...shall consider the CI of a proposed project on AQ, WQ, etc."
District CMP	Minimizing and mitigating CI through planning and policies
Prince of Wales Area Plan	To consider CI
District CMP (Northwest Arctic Borough, implementing NANA CRSA CMP)	Protect subsistence uses and lifestyles
Matanuska-Susitna Borough (MSB) Title 23	Directs management of borough-owned lands; sets use criteria
MSB Title 17	Sets standards for land use, flood zone damage protection
MSB Title 11	Sets standards for management or roads, streets, sidewalks, trails in the public interest; design and construction techniques for prevent impacts
MSB Title 9	Addresses water pollution control to ensure water pollution is mitigated, specifically sewage disposal
MSB Title 8	Addresses health and welfare, litter and associated impacts
MSB Title 6	Addresses clean air;environmental protection
District CMP (Pelican)	Enforceable policies regarding cumulative impacts (although not specifically stated)
City ordinances (zoning, building, harbor) (Pelican)	Directed to build according to zoning and building codes
District Program (Kenai Peninsula Borough) (2.7)	Consider in the review of coastal projects, ambient air and water quality and habitats;
Floodplain Ordinance (KPB)	CIs are mentioned; include historical, current, and future forseeable activities (only applies to mapped areas in floodplain); all of floodplain is within the coastal boundary
Kodiak Island Borough Zoning Code (1990)	Special district zoning with CI section - conditional use permits (CUPs) required in rural zoning district
"	Conservation Zoning Code - all areas where CUPs are required, burden is on Borough to deny the CUP if cumulative impacts would occur, based on "credible scientific evidence"

Local or Coastal District Sources of Direction (continued)	
District CMP [City and Borough of Juneau (CBJ] - Coastal Management Plan's Wetland Management Plan	Staff reports on wetland projects to the Wetlands Review Board re: effect of a project on wetlands base; this is a procedure but not a policy, because it does not require them to take a particular stance or action; an annual report is required re: all wetlands impacts
Memorandum of agreement between CBJ and Alaska Dept. of Environmental Protection re: impaired water bodies	The two parties are to consult re: impaired water bodies (7 listed in CBJ); no specific action required however
CBJ Ordinance for CUP	Requires traffic planning to be done in association with projects proposed, which could address effect of project on existing traffic,i.e.CIs
District CMP (Haines)	Draft plan included "consider CI" (not part of adopted plan) (note: "CPC removed the draft language before approval")
District CMP (BSCRSA)	Review activity, consider potential CIs, address them

Part B: Cumulative Impact Sites in the Respondent's Area.

For this survey, we are using a general concept of cumulative impact. When you respond to questions, please think of your experience in light of this general idea rather than a strict definition. I'd like to read it to you, then ask you whether you can think of sites in your area where a cumulative impact has occurred.

A cumulative impact is the effect of an action when added to the effect of other past, present, and reasonably foreseeable future actions, regardless of who undertakes the various actions. A cumulative impact can result from individually minor but collectively significant actions taking place over time. In other words, several minor effects add together to cause a more severe impact. A cumulative impact can be environmental, economic, social or cultural in nature. The impact can be from a single source or from multiple sources added together or added together over time. For this survey, cumulative impacts are presumed to be adverse effects. Would it be helpful for me to read this concept again? So in general terms,

3a. Are there geographic sites in your jurisdiction /area of concern where you believe uses and activities are causing environmental, economic, social, or cultural effects to add up over time?

63 Yes 7 No ___Don't Know

3b. [If Yes] Could you please name the geographic areas or sites (be as specific as possible) being affected? And for each site, please note environmental resources (such as wetlands) or economic, social or cultural uses (such as commercial or subsistence fisheries, or tourism) that are affected. Also, what seems to be causing the impacts?

[Interviewers filled in Table, See Appendix B for all sites listed]

4. Could you choose the site or situation you know the most about, for a few follow up questions?
Site/ Situation_____.

[The responses from this section pertained to very specific sites and were not entered verbatim. Coded responses are analyzed in Chapter 4.0 and specific case examples are sited in the "Cumulative Impact in Brief" text boxes throughout Chapter 4.0.]

4a. How was it determined that impacts were adding up and causing problems over time?
4b. How was it determined that problems needed attention?
4c. What steps have you taken to address the cumulative problems, if any?
4d. What steps have been effective and why?
4e. What steps have not been effective and why not?

Part C: Process Used to Identify, Consider, and Control Cumulative Impacts.

Next, I would like to ask you about any steps you take to identify, consider, and control cumulative impacts. In other words, how do you typically learn that cumulative impacts are occurring, how do you decide there is a problem and what to do about it, and then what actions do you take or what techniques you have used to control the impacts from getting worse? Again, a cumulative impact could affect environmental, economic, social or cultural resources or uses. The impact can be from a single source or from multiple sources added together or added together over time. So,

5. Is the process you have just described for the _____(impacted site) very typical of what you do? [If yes, skip to 9] If not, I want to ask you about your more common practices.

6. Do you take particular steps or use certain techniques to determine whether a cumulative impact is occurring or has the potential to occur? If so, what are these steps or techniques?

7. What kind of process or techniques, if any, do you use to consider cumulative impacts? In other words, after you know a cumulative impact is occurring or is likely to occur, what do you do to decide if that cumulative impact is significant and needs attention? And how do you determine what attention it needs?

8. What kinds of actions have you used to control or limit cumulative impacts? In other words, after it has been determined that a cumulative impact is occurring and it needs attention what do you do to remedy the impact?

[The responses for questions 5 through 8 were were not entered verbatim. Responses were coded then analyzed in Chapter 4.0]

9. What obstacles or difficulties, if any, do you face in identifying, considering or controlling cumulative impacts?

CI not a priority; • Public/staff don't recognize the importance of monitoring of impacts and looking at them in a cumulative way; • The state does not address CI from logging anywhere - it is irresponsible of the state; • We don't do any science; • Dependent on others to be forthright in divulging their plans; • No control over anyone elses development, i.e. no land use control over adjacent land; • $ Funding; • Lack of technical ability to do formal analysis such as water quality testing; • Lack of time and $ for big projects, we have enough to do; • Need staff for inspection and monitoring; • For big projects replanning up-front from multiple agencies working together (a task force); • Unclear definition and unclear prodess or procedure to identify CI, i.e. where do you stop? How many projects or impacts do you add in? How far in the future do you project? ; • Public acceptance is lacking; • Need a collective understanding by the public of the functioning of systems; • Misinformation is often given to locals from outsiders exagerating the potential impacts - bad advice; • Not having enforcement capability; • Not having $ and staff time for field inspections and monitoring; • Local communities reluctance to accept responsibility for permitting or land use; • Not having a hammer (where no permit is necessary) ; • Not enough staff (field presence) ; • Determining what an acceptable level of use is; • Politics; • Lack of $ for O & M in small villages; • Never having really planned to control or address CI (Never been called CI) ; • Lack of recognition by public and other agencies of the additive nature of impacts over time - each small piece is not thought to hurt; • No clear regulations to provide protection, in conjunction with a plan, for areas experiencing CI; • Level of coordination missing from amongst state agencies; • Lack of manpower and resources to even look at CI, don't even have time to look at them during a consistency review; • Getting people to look at both sides of the equation i.e. weighing both benefits and impacts, particularly benefits. Every decision has tradeoffs and consequences - getting people to see the positive is difficult; • Resistence based on economics/job loss (political pressure) ; • Institutional resistence - it's not been done in the past, why now? ; • Insufficient time, $, and staff; • Measurement of the impacts is difficult and determining the effects of the CI; • Insufficient staff time; • The mindset i.e. no mandate, applicant resistence, department backing etc. ; • Need specific regulations to minimize discharge or to consider cumulative discharges; • Coming in at the tail-end of the development process, after development has already occurred and trying to control the problems from that adjacent development; • Lack of funding, staff time, and public awareness; • Some staff not thinking it is an issue and local government claiming it is an unfunded mandate; • Issues are emotional - public sentiment against aquatic farming, not necessarily based on science; • Time constraints, lack of staff; • Lack of resource data; • Commenting agencies not having time or $ to provide data; • Not having wetlands classified as to their values and functions - results in piecemeal decisions; • Changing the way we treat habitat will require economic sacrifices and the public will not accept this at this time; • Working strategy mutually acceptable to all agencies - it is nearly impossible to get all agencies to agree (on a rehab project for example) ; • Recognizing, documenting, and calculating the CI; • Having little control over slowing down CIs or reversing them - stopping them is best but is not possible; • Getting agencies or companies to acknowledge them and act on them; • Public opinion, i.e. you can't get support because of the economic stakes of those that would be regulated; • The borough not having authority or control; • There is no process; • There are not obstacles, we just have not done it; • Not having CI as a mandate; • No $; • The AK mentality is that no government is good, i.e. no public support; • No $; • Trying to define what CI are, and how significant they are; • Budget is too small to get to sites (landfills) before permitting, during construction, or after closed for monitoring; • Lack of resources (staff, monitoring equipment), funding,

base information, and time for prevention. We are mostly reactive; • Lack of funding - access to sites is too expensive; • lack of financial support, tools; • problems with attitude that government is an intrusion; • climate and distance makes monitoring expensive; • other agencies are the problems in all phases of addressing CI; • definitions of problems/CI are different between agencies (no consistency); • data bases inadequate; • applicant has more data than agency; • difficult to coordinate agencies to discuss mitigation; • difficult to determine significance when single impact (piece of project) does not appear to be substantial at first so not considered; • with older existing facilities, there are $ problems, difficulty getting paperwork in, methods of inventorying are not good; • may be creating problem without realizing it (e.g. fuel leaking gradually, unnoticed); • problems with identification - detection is haphazard; don't see all impacts; other agencies have jurisdiction and are not communicating; • problems with considering impacts - take place in context of politics in the office; no criteria for determining significance; too subjective; not clear who is responsible; • problems with controlling - same as above; difficult to reach agreement on approach; need consensus on how to resolve; • no problems with identification; more with controlling; • mitigation is beyond control; • difficulty in considering CI - limited expertise; new and big issue; while there are technical models, methods are new and need to be modified on a case-by-case situation; • control of CI requires staff and authority; • need better monitoring and compliance and analysis of carrying capacity of the resource; • jurisdictional problems - solutions may not be within responsibility and authority of agency (i.e., land use changes); • problem with definitions especially on how to address socioeconomic and environmental CI; • not clear on how to balance socioeonomic with environmental - difficult to determine which is moreimportant; • permitting is complicated and so industry (i.e. visitor industry) goes to "easier" places to develop; • resource managers not familiar with economic considerations (i.e., visitor industry); • direction and mandates are lacking • political reactions internally in the department cause comments [by reviewers] to be extracted by managers, in an obligation to encourage development • hard for people (users, decisionmakers, staff) to articulate the problem; • there are legal and political constraints in crafting solutions; • time and money; • can't control a local municipality in their enforcement of local ordinances; • lack regulatory BMPs for many activities in Alaska; • the five year cycle of permitting limits the frequency with which EPA addressses a permitted discharge [for NPDES permit renewal]; • haven't yet said whether a change in community diversity is bad or good, don't know; • often don't know natural fluctuations as backdrop - need to look at biological baselines that don't change; • routine operator monitoring reports [for NPDES permits] are not consistent and not all operators are doing it; • inadequate staffing to verify through monitoring whether existing controls are working, such as BMPs, must rely on permitees to monitor receiving water changes; • property rights is a big obstacel, unless the city can enforce a law through state or federal regs, can't enforce anything; a sort of curtain comes down beyond a line (i.e. the Corps' or DFG's authority) on a waterbody; • [an obstacle to identifying and considering a potential CI is that] before a public hearing, we have little information about specific bays [where proposed activities would occur]; • [obstacles] depend on the administration and who they are, whether they are sympathetic to a village's interests; • CI is a fuzzy problem, with turf wars and heads buried in the sand; • internal agency policy struggle, due to department's interest in economic development, so it appears the department was not set up to address CIs, because CIs would be seen as being used against economic development; • most of the time, the community advocates and justifies the development of public projects, because they want public facilities projects; • biggest obstacle is how each agency has its own interpretation of CI, and sees the other agencies' roles as different; • lack of team work throughout the governing bodies (state studies are not shared with locals and the borough, though this information could be very useful; • federal and state governments force us to study and wait, therefore problems compounded before we did anything; • reactive individuals pay attention to what is pressing, meanwhile other problems are evolving and not getting proactive attention; • money, staff and time - the cycle of permitting is frenetic and its hard to think of the big picture while you crank through the applications, on a schedule; • even with a district CMP policy, the wording is not strong enough, so it is hard to implement; • a project may not require a permit for the activity which is causing the CI, so it becomes very awkward to require stipulations, mitigation, etc. though they are needed; • part of the obstacle is getting the people educated enough to understand why the activity is significant and deserving of attention, department resources and action - have to talk with people internally as well as outside the department; • costs are #1 obstacle, but also

weather, transportation (the area is landlocked 8 months of the year); • unfunded mandates, limited resources.

10. Do you face any of the <u>following</u> obstacles in identifying, considering, and controlling cumulative impacts?

44	inadequate direction, guidance or tools with which to address cumulative impacts
45	lack of political or institutional support for doing so
44	insufficient time to pay attention to cumulative impacts
52	insufficient funds to assess and evaluate cumulative impacts
49	insufficient site-specific information (such as baseline data) about resources at risk
48	insufficient information to determine whether a cumulative impact will be significant
36	inadequate experience to address cumulative impacts
41	the absence of a definition of "cumulative impacts" established in regulation
30	limited authority to address cumulative impacts, due to land ownership
____	Can you think of any other obstacles you face?

• Federal agencies deciding against a development when the agency has no personal knowledge of local conditions; • No systematic way of tabulating past permitting (i.e. tracking) as is being done on the Kenai; • Not being brought into the loop early enough; • The institutional approach toward what constitutes CIs and how you go about dealing with them; • Department recognition that there is a CI problem; • Public perception - the regulated community may not see that they contribute to the sum total of the impacts; • People were unaware of potential impacts and were taken advantage of by governement and big corporations; • Not having a CI process; • Need agency direction; • Only having the time and resources to respond when the risk is great; • There is an organized group of the public that fights any regulation, especially when economic loss is the result; • Need standards for evaluating and measuring CI; • Public opinion - lack of public support; • Lack of authority to control CI; • need consensus and cooperation between others with the expertise in determining if CI exists and if it is significant; • need to work with other agencies in planning efforts as partners; •government leaders need to acknowledge tourism is a resource not unlike natural resources therefore other developments have impacts on tourism; • by the end of a project and permit issued, it could be out of compliance with CI regulations; • project with timeline (financing, seasonal nature or project) could be affected by insufficient time to pay attention to CI; • tend to do more "office" work than field monitoring; •inadequate experience with remediation techniques; • need state and federal agency funding; •politics of situation affect work; • local knowledge invalidated because they are not "scientists"; • lack guidance/tools regarding terrestrial systems; • need to look at geographic focus, values and functions with regards to terrestrial systems; • COE needs to look at nationwide permits (NWP) - no systematic monitoring to see if NWPs are adding up; • obstacles depend on make-up of legislation and administrative tendencies to provide permits that based on political convictions; • new regulations regarding tank farms seem ridiculous - cost to improve safety is an impact; • staff resources and lack of travel money; • subjectivity in defining CI; • tough to get any of the techniques listed; • tough to define level of unacceptable impacts; •funding for field presence; • CIs are subjective and easy to challenge; • lifestyle questions and quality of life - understanding CIs and education regarrding problems is obstacle; • money.

11a Next, I would like to read to you a list of techniques which could be used to identify, consider or control cumulative impacts. As I read each technique, please indicate whether you use the technique to address the problems associated with cumulative impacts. *[Interviewer should note a number next to each technique used; 1,2,3, etc.]*

46 search files to find out about impacts from past projects in a given area
59 draw on other agencies' activities, information or staff knowledge
49 rely on other agencies to address cumulative impacts
48 Apply planning techniques (such as research techniques from land use planning, community planning, master planning, comprehensive planning, or economic development planning)
35 use NEPA or EIS processes
60 use permit review techniques or consistency review techniques (such as requests for additional project information)
34 conduct special studies (such as to monitor ecosystem health)
53 conduct field surveys
39 measure an impact against specific environmental standards
29 assess environmental indicators (such as species or conditions which may change over time)
39 apply cartographic techniques (such as a Geographic Information System)
63 apply your own professional judgement
62 hold discussions internally (at your district or agency)
42 through planning, establish enforceable policies with the intent to prevent significant adverse cumulative impacts from occurring
31 establish thresholds or standards beyond which impacts are not allowed
54 attach enforceable stipulations or mitigation requirements to permits, leases, or licenses
23 in a consistency review, find a project inconsistent based on an enforceable policy regarding cumulative impacts
31 limit access to the resources at risk (such as with a lottery or a first-come-first-serve system)
41 take enforcement actions (issue notices of violation)
52 monitor site-specific impacts
44 maintain a field presence to prevent further impacts in the vicinity
46 based on impacts to date, make a change of policy regarding future impacts
____ Do you use other techniques to identify, consider or control cumulative impacts?

• Outside professionals to assist them; • Talking with the applicant (public education) ; • Search literature to determine potential impacts; • Public education; • A general awareness of the projects going on in the district and monitoring them informally; • consult users for identification of CI; • working with other agencies as partners;• interview locals for information regarding conditions; • use consultant to get an independent evaluation; • prioritize to determine if it can be addressed; • general public awareness; public education is critical - develop fliers and knowledge of how to reach public; •rely on applicant's reporting and citizens' complaints; use school projects like water watch; •propose legislation; • use local input; • use local subsistence users - good "tool" for tracking CI because they see changes; • partcipate in national surveys re CI ; • bonding for performance or certain permits actions; • talk with "old-timers"; •

DNR's public processes; • bring problem to public attention, neighborhood associations; • work with village people.

11b. Of the techniques you just mentioned, which techniques have been the most successful in addressing cumulative impacts, and why?

• On-site evaluations to learn from one project to use in the future; • Monitoring and field presence and permit stipulations; • Good proactive approach - Planning; • Public education through the permit process; • Denying a permit; • Conditioning permits in order to avoid or mitigate impacts although there has not been specific follow-up to determine success; • Application requirements because they specify what the applicant must do (they are specific) ; • Consultation with company well before mining starts to try to anticipate problems well in advance and then minimize or head them off; • Field presence and information from the applicant on how to do things differently; • Monitoring, enforcement, permit stipulations, and modifying policies - these enable us to correct for past problems and look at new technology for minimizing CI; • Interaction with agencies - i.e.drawing on other agencies information and relying on them to address; • Best professional judgement - because there are no other guidelines; • It depends on the impact but generally the CMP and zoning regulations - because it allows case-by-case analysis, landholders are informed, and conditions /stipulations are applied to each specific use; • Notification to ublic (public education) ; • Field presence to enforce mitigation; • Planning activities; • Depends on the situation and people - for some situations enforcement works best while for others it is education coupled with permit stips; • Stipulation on the permit or lease - because you have the plan in front of you and it is easier to prevent impacts than to change them once the project has started and time and effort are easier given staff time available; • All parties coming together to present issues on the table (proper communication and negotiation; • Being firm as a municipality; • Making sure you have the tools and techniques; • Programs must be field-oriented or lead to field results or field work; • Working with planners up-front; • Education with on-the-ground operators (timber operators) ; • Follow-up/monitoring on how well the BMPs are working; • On-site review (field survey) ; • A court mandate - because it forces the agency to do CI assessment; • Up front planning, although we don't do it enough; • Permit stips and enforcement; • Permit review/consistency review - because people start thinking about CI; • Monitoring followed up by enforcement; • Search files, drawing on other agencies, permit review, professional judgement, and limiting access because it gave everyone a view of projects in a given area and provided a mix between science and the emotions of the public; • a combination of the city working with its council and also working with state agencies for gathering information; • Permit stipulations - because that is all we use; • Some internal ADF&G policy changes have occured based on research done in the state but they fall way short of controlling CIs; • Having time to study is needed because site specific studies are useful; • Permit review - because it is most direct and specific method available to me; • None of the techniques have been successful; • There is some good guidance in the area plans to address CI; • The locating, siting, design, operations, and monitoring to avoid CI before they happen; • Better planning - poor planning is the cause of the problems but the permit process and enforcement is the best one available; • It is a function of the specific subject e.g. for commercial uses enforceable stips on the license works best, but on other uses mitigation and close monitoring work - a field presence is most effective; • taking enforcement actions, monitoring, and maintaining field presence cause action and consequences for not taking action; • applying cartographic techniques, professional judgement, and internal discussions support enforcement and monitoring actions well; • on-site field work and enforcement/stipulations; • enforceable policies and stipulations; field presence; • conducting special studies, field work, and assessing environmental indicators identify problems ahead of time so they can be handled before they get worse; • monitoring, field presence catch problems ahead of time; • experience in agency/internal discussion, professional judgement keep policies consistent; • consistency reviews (finding inconsistent) gives options to applicant so they have a choice to comply or not; • enforcement and stipulations provide "hammer"; • discussions and meetings and using professional judgement; • planning and use of enforceable policies keeps public informed and prevents problems: • permits and stipulations provide ability to enforce / levy fines; • all of those listed in survey instrument work but use of cartographic techniques and planning work well because they are easily performed within

time limits set forth by statute; • enforceable stipulations; • enforcement and monitoring; • changes in policy; • searching files and using agency information work with varying degrees of success; • the more professional advice, the more reliable the determination and the more reliable the action; • enforceable stipulations work well; • limiting access (like through a lease or competitive sale process) ends up with financially sound development of resource; • NEPA and studies are successful because they encompass agency responsibilities and through the NEPA process the rest of the techniquese are addressed; • attaching stipulations provides incentive to perform; • planning and development of enforceable policies; • special studies, field surveys, and assessing environmental indicators require looking to other agencies for technical help; • enforceable policies, stipulations; • professional judgement and internal discussions; • rely on other agencies; •research, agency knowledge, applying planning techniques makes CI less speculative because it expands information base; • measuring impact against env. indicators makes easier to determine significance; • stipulations enforceable; • working with other agencies in planning efforts as partners helps carry out mutual goals and objectives; • professional judgement and internal discussions; • searching files, drawing on other agencies, relying on other agencies and applying planning techniques somewhat effective; • planning, enforceable policies internal discussions, and relying on agencies works now because easiest and most straightforward because of staff and funding; • enforceable stipulations are specific and allow you to follow up/enforce; • planning and establishment of enforceable policies gives you a "place" at the table (i.e., elevation); • interviewing locals gives you information from your constituents as to the problem and if it is signficant; • using outside consultants gives you expertise besides regulatory agencies in order to analyze the problem; • finding a project inconsistent tells agencies that the problem is significant to you and it needs to be addressed; • permitting / czm consistency review process gives ability to put conditions on development to prevent impacts, avoid cumulative component; • reconsideration or making policy or ordinance changes has strengthened ability to control CIs in the future (although it might not address specific impact at the time); • special studies effective (like Kenai River 309) due to adequate time and funding to document baseline and historical conditions to show without a doubt that there has been a change...until a problem is quantified, it is denied...studies must be dynamic and the results updated via the permitting system. • state area plans go through full public review, subsequently there is alot of public support for carrying out the plans; identify specific stipulations and mitigation requirements which are very performance oriented so you can get measures of performance, violations are clear to any of the enforcement staff; • in wetland ecosystems, would like to think the wastewater and NPDES permit programs are efffective, they have the ease of numeric chemical measures of pollution; require applicant to do the work, and its a legal document; in terrestrial ecosystems, its a different story because of relying on biological parameters which is harder; • regarding enforceable regulatory best management practices (BMPs), want to know if they're effective; • once data is available, tools open up to permitters, who then have a basis for requiring protections to be in place before a project moves ahead; once the public can see the potential losses, they start thinking "what can I do to prevent the potential losses?"; geographic information systems (GIS) can be very useful to many user groups; the Kenai River is a world-renowned system, so that is a strong 'attention-getter' for the problems there; so it is effective to have good data, then local recognition, ('common ground') that something needs to be done, then implementation on the local level; • reliance on other agencies is efffective, due to the expertise not available at the City level; • Field presence is the most effective tool, in advance of a permit being issued, and in advance of a renewal of a permit (at that time there is opportunity to require other activities; • the EIS for Red Dog Mine was very effective - the areas that were discussed <u>have</u> been impacted, and the baseline information generated is te only baseline information in the area, so that is still useful; • field presence, working with other agencies, and planning documents are the prevalent techniques that work well; • <u>money</u> is most effective tool...when an agency has support for their priorities; • the state is trying to enable good district planning to be done, but it is not clear what degree of success is attained; • working with local people (such as elders) and local resources is most effective since they have the most knowledge about water quality and habitats and they are the most affected by the use of renewable resources; • also working with the company [applicant] causing the problems can be effective, if they are reasonable; • knowledge from experience, and common sense are effective in addressing Cis; • being in the field and looking at the problem with the person doing the activity because all parties see the problem and it is harder to deny; •

trying to get voluntary compliance is effective as it gets people to buy into the solution more directly than going through official enforcement notices from the department (which is more formal, more time, more energy); • the most used techniques are: our own judgement, discussions with others in the office, working with other agencies, and checking old files (these work well because they are accessible to staff); • a combination of planning and historical review is effective, because we need something to compare with, to know what impacts are occurring; • the most successful situations are when we go through the Planning Commission, Port Commission or DEC, with a process in place to follow.

11c. Which techniques have been unsuccessful in addressing cumulative impacts, and why?

• CI is a new issue so we don't have a track record to know which techniques work and which don't; • Having to rely on local government or someone else to put on land use controls; • Enforceable policies are not enforeable; • Avoid hard-core enforcement - try to work with people before problems develop; • Starting off immediately with enforcement; • Going to other agencies for cooperation because they view an AMSA as a preservation document where it should allow "balanced development" ; • We mostly look at direct impacts, not CIs; • After-the-fact education ("re-active education") - once opinion on a project is formed it is difficult to change people's minds; • The institutional mindset is making it more difficult than it needs to be; • Department policy - because CI is not addressed by the Department; • Forest Service planning and DNR planning - because they don't take into consideration local comment; • There are no CIs yet, we prevent them first - The CIs look significant on paper but there is still a vast expanse of vacant, unimpacted land for example "90% of the Kenai Peninsula" ; • Direct confrontation; • Enforcement - it is too confrontational; • In monitoring timber harvest techniques operators "perceived" the monitoring as an evaluation of staff • Communications with other agencies (DNR in particular) - because of different agendas, politics, etc. the agency reviews aren't always consistent (interpretations of regulations are different) ; • Planning process - long-term language and interpretation is not always effective or specific enough; • Just that there are things we wish we were doing but don't have the funds for (e.g. monitoring); • Maintaining a field presence - because there is not enough staff; • None were unsuccessful - they are all useful in their own way; • A lack of knowledge of the tools available, lack of an ordinance, and the lack of experience to recognize CIs; • They all work to some extent; • Limiting access and threshholds would be effective if we did it but the agency mitigates and minimizes rather than stopping CI, thus the impacts are allowed and still adding up; • Being forced into developing mitigation when we have no information - the mitigaton ends up being way off target, with good info and specific studies we would be able to suggest good, effective mitigation; • Enforcement - because the ADF&G has biologists which are not regulators by nature (to have good enforcement you need someone with more of a state trooper mentality) The biologist should be doing the assessment. The suggestion made was to pull enforcement out of Habitat Divison and put it into a division with and enforement mentality; • Getting local government involved because of local politics; • Staying away from expensive planning in favor of a field presence; • policy changes not used; • NEPA over complicated and based on inaccurate models, enforced based on philosophy not science, too expensive; • enforceable policies applied beyond state and federal law in area management plans; • consistency reviews do not work; • relying on agencies doesn't work because it depends on how interested that particular agency is in addressing the CI; • applying professional judgement and holding internal discussions works well until Juneau steps in; • NEPA is only valuable in early stages; • conducting field surveys and measuring impacts depend on staffing and funding; • thresholds and standards difficult to enforce; • mapping techniques limited in availability; • establishment of enforceable policies takes too long; • policy changes don't work well except for identifying potential CIs; • need incentive to do something (consequences like penalty) so other than stipulations, the techniques listed do not work well; • stipulations only work well if you monitor compliance; • monitoring and field presence only work well if you have the staffing and funding; • internal discussions not used like they could be to address CI; • policy changes not use as a technique to address CI; • monitoring information does not always include analysis and does not always draw a consistent "picture" from which to evaluate changes over time; • lack of analysis and "dumping" data into agency files does not constitute monitoring; • relying on agencies doesn't work because they do not know

how to address CIs; • using agency information is not always useful because it is a data "dump" with no analysis/conclusions; • policy changes do not work until some issue is driving the change; • good tools are not available to make a "cut" in incremental residential development activities; assembly did not implement techniques proposed to them by planning staff, therefore there are still limitations on local regulatory authorities; education [about the need to deal with CIs] has been slow, once people understand, they want to do something about them, but until then it is just confusion; • cannot tell whether or not the permit process works, because of lack of field monitoring and site information; limited annual travel budget and too many remote sites to visit • establishing enforceable policies is ineffective because the lead planning agency for the state - DNR- has become politicized, they've forgotten public trust doctrine in public plannning process; efforts to be big brother, know what's best for you is contrary to attitudes of Alaskans; also not protecting fish and wildlife resources even when the policies are stated in their own DNR plans; • with the Corps' 404 program, there is no successful protocol for evaluating CI on watershed basis, this led to the national policy on "no net loss"of wetlands and the outcome has not been good; • it has been ineffective to try to find a project inconsistent based on an enforceable policy regarding Cis, because districts or other entities overturned finding; • study results will be used or ignored as it suits the various public constituencies); • no particular techniques have been ineffective, because of a lack of time to even address cumulative impacts at all; • when regulations or requirements are lacking, protection against cumulative impacts is less effective / successful; • success of techniques has not been determined yet, for example: one agency has placed a moratorium on an activity in order to study it but no results are out after 3-4 years; • finding a project inconsistent based on CI hasn't worked, it involves other problems like which agency should carry a requirement; the regulatory process only works if there is follow through; • the elevation process in the ACMP is not effective due to the prejudices of the people holding those positions - inevitably there will be a failure in the process, and elevation also leads to lawsuits; • when an applicant doesn't want to cooperate it is hard, because unless the political will is there, we can't use the rest of the 'control' tools; also we try to treat eveyone the same, but it is not possible due to political directives to be more lenient to some; • monitoring and enforcement follow through is weak, as with so many agency programs, due to limited staff resources; front end work is emphasized -planning, permitting, but don't have follow through; • statistics / hard evidence are not conclusive proof that a concern is 'legitimate'; • techniques to weigh [consider] different values are not effective, because of the subjective judgement involved - and fights - about what outcome is better for most people (this occurs when some people who depend on subsistence vs. others who are big business interests have a difference in values); • receiving a 2 inch thick document from somewhere else is not helpful; • enforcement is diffficult, have no environmental 'cop'.

Part D: Closing Information From Respondent

We have a few closing questions about your work background and your outlook.

12a. Have you worked in any positions in which you encountered cumulative impact issues?
52 Yes 18 No ___Not Sure

[If No or Not Sure, go on to question 13.]

12b. [If Yes] In what context were you employed?, what was your title?, and what were your job duties (such as field work, monitoring, permitting, programming, or policy development)?

[Interviewers filled in a table, but it was not entered verbatim here. Results were coded and analyzed for Chapter 4.0]

13a. Earlier we asked about statutory and regulatory direction on cumulative impacts. Are you aware of any written internal guidance within your agency or district on how to address cumulative impacts?

16 Yes 54 No ___Not sure

13b. [If Yes] What is it, and do you use it?

• TMDL policies -whether to pursue them, and how to deal with 404 permitting in TMDL watersheds; • memoranda of agreement (CBJ and DEC); • district program implementation chapter ; • planning commission review and findings; • district plan components used to identify concerns and prioritze and set standards; • guidance documents re: contaminated sites and industrial waste water; • FHWA policy papers on secondary and cumulative impacts; • procedural manuals direct staff how to adjudicate and consider CI; • FHWA memoranda regarding project development; • no written guidance, just verbal; managers' point is that it is not politically astute to deal with certain cumulative impact issues, such as aesthetics or wildlife issues because the agency loses ground, loses friends and causes problems.

13c. [If Yes] Has the guidance been useful? Why or why not?

Guidance	Useful?	How Used - Why Useful?
Federal Guidance		
Federal Guidance on the Total Maximum Daily Load Process	No	Too new
TMDL policies	Too soon to tell	
FHWA Policy	Yes	Because there is nothing else
FHWA Policy Paper	Yes	More specific than existing regulations
FHWA Memoranda re: Project Development	Yes	FHWA leads amongst federal agencies in terms of dealing with difficult issues; memoranda helps DOT to address CI issues
State Guidance		
In the EIS for the ACMP	No	Very vague
In the management plans for individual state parks, e.g. Wood Tikchik State Park	Yes	It gives you a document to hold up to express the public's will - taking management subjectivity out of it.
DEC Commissioner Memo	Marginal	Has provided some ammunition
Contaminated Sites Guidance	Yes	Standardizes how agency will address
DNR Procedural Manuals	Yes	Requires open public process, multi-agency, multi-purpose; describe how to implement plans
Cumulative Impact Reports by DGC & DNR	Yes	The DNR report gets to the basics and directs your thinking, telling you where to start and how to outline a process.
DNR CI Report	Yes	It brought to the forefront the problems - created an awareness
DNR Policy and Procedure Manual	Yes	Threaded through the manual are guidelines which indirectly relate - It is useful because with each case type it tells you what to look for. It is, however not specific to CI.
State Implementation Plan	Yes	It specifically outlines steps to mitigate and avoid degradation to the air resource

State Guidance (continued)		
ADF&G Mitigation Policy	Yes	Sets standards and makes permitting consistent - resulting in no net loss.
Local or District Guidance		
District CMP, Comprehensive Plan, Zoning Ordinance, and Subdivision Standards	Yes	These have allowed them to go forward with needed development without harmful CIs - Has helped avoid CIs
In the District CMP	Yes	
District Plan components	Yes	Identifies concerns and places priorites

14. What additional guidance or tools, if any, would be useful to you in addressing cumulative impacts?

Training; • Specific training on evaluation and assessment of CI; • State needs to develop procedures for doing CI assessment (i.e. what to measure, and what CIs are occurring); • Time • $ • Site Histories - to learn what has occured on the ground and to determine what happens incrementally; • The ability to do a formal assessment to provide better baseline data to better monitor change. • More clear definition; • Better sideboards - thresholds (when do CI start, and where do you stop adding things in); • Training on how to identify and deal with CI; • Good definitions; • Timeline guidance - How far back should you look?; • A checklist; • Criteria to determine what a CI is; • Geographic specific guidelines to be used by permitters and applicants- to avoid CI first; • Public education; • Collaborative enhancement to reduce past problems (e.g. tax rebates or incentives); • A process or procedure on what to look for (a definition) and how it applies to what we are doing; • Specific studies, in-depth studies in certain areas; • Establishing threshholds; • Getting practical information (in-the-field knowledge); • Need a method to document impacts over time - standardized - to document long-term impacts from applications. Perhaps a checklist and the ability to use it consistently by department (would require training to all departments); • Direction by the Division, the agency, and the state (in statute and regulation) on a CI definition, standards on the minimum retention for habitat; • We need multi-media permitting - i.e. we need to look at everything at once instead of each individual agency looking only at their individual perview. (e.g. the State of NJ, and also the way EPS inspections are done); • CIs need to be addressed in statute and regulation; • Cooperative agreements between the regulators and the regulated community regarding CI; • We need a Department policy saying we do address CI and a definition of what CI includes; • Baseline and monitoring data; • Getting administration to admit that there is a CI problem and not being compartmentalized - recognizing the other regulations that regulators must deal with. "Rainbow" type training • Have to have integrated philosophy between agencies; • One day training or worksession in conjunction with the annual conference; • Specific guidance; • Policies; • Data (particularly in communities); • A mapping system (kept up to date); • A policy that defines CI and articulates the way CI jepordizes the mission of sustaining fisheries; • Getting the department to simply recognize that CI exist; • A policy on how to address and balance CI with the mission for maintaining recreatioinal harvest opportunities for fish; • A Department policy regarding CI (There are no regulations, policies, or guidance. The agency staff know CI are occuring but need more push from higher levels to address CI); • Standars and measurements that let anyone I.D. and assess to what degree CI are occurring; • A working (user friendly) defintion; • Better guidelines from the state; • A mandate; • Interdivisional communication group within the departements; • Need a vision as to what rivers should look like; • Need better mission regarding CI; • Coordinated effort between all resource agencies to establish criteria to I.D. CI; • Better education for people to see successes not just failures; • More resources to be out there looking at impacts before they get out of hand - prevention - by the time complaints come in it is too late; • Access to other agencies' successes and failures in addressing CI (Information from other agencies) ; • Regulations and implementation manual for the regulations; • Better planning; • Staff and $; • Guidance or criteria to determine at what point CI become significant - When do CI become a problem? - Before that threshold is reached you should not have to address CI, but after it is reached you do • better regulations; • definition in statutes with very distinct boundaries drawn/described otherwise could get out

of hand (e.g., do you consider the tributary of the stream for CI or the tributary and drainage or the entire drainage or the entire ocean system?); • additional data for evaluating CI; • need regulations or use existing regulations an dpply to spill prevention at smaller tank farms; • use agency data bases already in existence; • need definition describing how CI occur; • better understanding by other agencies of state water rights program and laws; • solid definition and guidance that discusses how CI accumulate and what should be key elements to look for; • guidance should not make decision as to whether CI tolerable - only spark consideration and how to obtain further information; • guidance shouldn't become policy - should be procedural and not force conclusions; • more guidance from FHWA or any agency with jurisdiction over projects (e.g. COE and FAA); • more enforcement capabilities; • need staff ,-time, and funding; • need guidance from other state and federal agencies like the COE (especially regulatory agencies); • need information on human carrying capacity, resource carrying capacity; • need to describe what would be considered socially-acceptable limits to viewing resources; • need more specific guidelines (may already be in the existing DGC documents); • districts need their own definitions; • for more undeveloped areas of districts a definition would help avoid situations where district left with agency definitions; • need to get state and federal agencies who create project documents for review to have joint training for reviewers; • need step-by-step process; • need better understanding of what a CI is and easier ways to control them; • make it possible to incorporate into decision making the experiential, traditional and local knowledge on same level as scientists / biologists; Do not have to have been born here, could have extensive knowledge; • all agencies just starting to realize a need to address those issues and what conditions we would like to have included to preserve certain areas (land, social, cultural values); • like to see ACMP grant a set of funds so could start doing own environmental studies in the region; • delegate as the authority and they will do what they can in the region; • tools like people, time, money to do what needs to be done; • don't feel the need for more DGC-type studies - elicits more frustration; • priority should be on gathering site-specific info; • money should be spent closer to the problem sites; • when we go to get data/staff assistance, local input, there are too few resources; • can't even get administrative habitat regulations to implement statutes after 15 years, so not sure how CI guidance could be established • would be nice to have CI guidelines specific to Title 16 rather than just the Air, Land and Water Quality standard; • control over wildlife and birds (terrestrial species) on private lands not reached like fish in waterways (supposed to be done via DNR land use planning but not working well); • would be helpful to have a practical, common sense approach to the issue; • very complex - easy to say we need additional guidance but very difficult to address (not much confidence it can be done); • DNR does decent job addressing CI; • need additional statutory powers; • need definitions; • who should carry responsibility for CI? (possibly the lead agency?); • need defined support (and strong enough policy language or adequate ACMP statutes) which when appealed/elevated it can stand; • would like a report like the previous DGC report but easy to read, digest, identify issues, problems, solutions; create starting point for decision-makers; otherwise they won't use it; • must have more than academic information on CI in order for policy-makers to use it • only academic information seems to be available on CIs -if want real movement from policy makers, must put info in a form that they can act on • DNR definition needs to be clarified; guidelines should include what DNR wants to look at for CIs • would be helpful if state would coordinate between regions based on river systems and watersheds - use of unrecognizable land divisions does not help management - impacts often occur upstream and flow downstream • may be other CIs in the area that the district is not aware of due to current boundaries of jurisdiction • have to recognize that Alaska is different and differences within the state by region - culturally, environmentally; • regulations do not fit every place • can't expect districts to do all of this work, especially with budget cuts • structured protocols to asess functions of terrestrial systems (also with wetlands); • would like greater use of local district plans and local government with planning and zoning authorities - most CI problems are in communities with P &Z so the government structures are in place with comprehensive and district plans and enforcement powers • fees to increase funding for more Section 401 certification staff • structured protocols to assess functions of terrestrial systems, such as through regulatory BMPs; this gets down to functional attributes of the area...if terrestrial, need a definition of the functions - once they are known there should be protocols in place to assess and protect them and determine if they are well maintained over time? • would like money to hire local environmental monitors • need greater use of local district plans and local government authorities,

especially as links to non-point source solutions • most problems are in a location with planning and zoning, government structure, and coastal district plans and enforcement powers to address non-point sources of pollution • need more work done on subtle indicators of biological stress (such as enzyme changes, rather than simple presence of infauna, for instance) • need regulatory BMPs for certain uses - the responsible land management agency should have them, such as DNR for agriculture • for a small community like ours, we can barely afford to do the basics such as adopt a CMP, much less these "extras" (studies, investigations) because we lack the resources • a standard checklist might be helpful if it is possible, it would have to be adopted generally so it is consistent among communities • need definite regulatory language and mandate; • NEPA provides good mandate and methods but need state level method; • need to use what is available, cost-effective, time efficient, need management assessment and methodology • Kenai River 309 study is good on main stem if river but does not address tributaries; • COE used cookbook approach; • no tools exist to deal with the intangibles, there is a disparity of opinions and anyone can refute a position on intangibles; • Kenai River 309 tried to address all issues then groups either warped or ignored findings.

15. Do you have any closing comments or recommendations regarding how cumulative impacts are - or could be - addressed by state agencies or districts, and if so what are they?

• Don't use "Homeless stipulations" on coastal consistency findings which the agency has no authority to enforce, such as stips on reclamation of a private gravel source over which DOT&PF has no authority; • funding so communities could obtain the professional expertise or technical assistance; • The stakeholder is the coastal district so put CI into the CZM plans - make it a section in the plan; • No unfunded mandates - if there are CI regulations make sure they are funded; • ADF&G needs clear policy direction through all branches doing CI assessment; • The shortfall is with coastal districts not realizing CI's exist - in the search for economic development CI's have been ignored; • Natural conditions need to be taken into account (e.g. natural levels of pollutants) ; • Baseline studies are needed in certain areas; • Provide more $ for field presence; • Track impacts as they occur and minimize them; • Sort through the ACMP (it is an obstacle) clean up overlapping authorities, straighten DGC's interpretation, etc, ; • There needs to be a documented policy - we live in the short-term as brush fire specialists - we need to move toward long-term solutions; • DEC has gotten into fees for inspections and technical assistance - the process is not cheap for communities - we should consider "mulit-media" fees; • The CMP already does it - not for CI in particular - but it "zones" areas for development, in essence it controls where CI will be allowed. It is ridiculous for Congress to make the states address these issues, it should only encourage them; • The definition should be tightened up - it should be measureable, have standards, better specific criteria on which to judge impacts for adjudicators; • Policies in coastal programs are not enforceable; • The state needs to come out to the communities to educate local leaders on the regulations i.e. better outreach and communication. There is a lack of training in the small communities, a mayor with multiple responsiblities has little time or training to deal with the issues and regulations of something like CI; • Impacts from log transfer facilities need enforeable standards/policies, especially a restoration policy/guidance; • We have to be careful that CI assessment does not just become another tool for stopping development. That is why you need a threshhold - addressing future impacts is too much guesswork; • Just do it - make it a priority. Require CI assessment in permit reviews and ACMP regulations; • The big problem is we need baseline data, even with good policy direction you need good data, with good baseline and monitoring data we could tell what might happen in a cumulative sense; • Need to work together more - agency staff need to look past their narrow job descriptions, not becoming so compartmentalized; • Pre-planning at communities on what kind of development they want to see in a 10-20 year timeframe; • Prefer to have CIs addressed at the state level - because the local level has no time, but the local level could help provide information; • A uniform definition and specific criteria on when the CI has occured - is it with the first house in the development or the 5th?; • The agency needs to work closer with other political entities on oversight of land use to get information to them so they incorporate ADF&G information in land use decisions - be more proactive - decisions are currently made

in a vacuum; • Need help for smaller cities from agencies - we don't have the staff; • First the state government, and the ADF&G should take responsiblity; • The reduction in budgets means a loss of employees which means we must do more with less. CI are important but any new regulations must take into account limited staff and time; • People need to have an open mind regarding CIs - CIs are dependent on the person and their philosophy - thus feelings shape the CI discussion. We need to focus on the successes too; • Need more help (staff); • address more realistically particularly relating to real impacts relative to overal natural, economic, social or cultural environment; • tailor to local conditions and relate to problems facing districts; • definition would set limits on application of CI terms; • time is a limiting factor in addressing CIs; • people need to understand agencies use data bases in making decisions; • funding not there for enforcement (southeast); • baseline data lacking for decision-making re: CIs (e.g. water resource data, quantity, quality); • do not include highly speculative impacts in definition of CI; • do not extrapolate to extreme; • be sure there are really impacts before requiring changes by applicant - provide more certainty that effects are there and have a high probability of occurring; • characterize CI objectively, not subjectively; give criteria under which a CI would become significant; • any change is not necessarily significant; •need to measure over the long term; • add human and resource carrying capacity analysis to evaluation of CI; • districts experiencing CI should talk to agencies regarding their experiences and level of frustration - not in written form only but "people-to-people" so as to increase communication; • get baseline data up front; • seek practical solutions; • talk to local people for creative approaches to problems; • maintain teamwork approach; • use agency files and incorporate information into decision-making process; • improve lines of communication between local communities and resource agencies; • need good cost-effective methodologies; • talk about political ramifications; need better implementation at the local level • bigger picture may be much different - not good at looking at the whole picture; tend to address what is most obviously their responsibility; • EA and EIS processes are cumbersome and not always practical; don't wait for CI study - 309 study on Kenai River was 2 year study and information is constantly changing; • need dynamic data collection system; • information must gain ownership from the user groups and local boards; • must use the data and there should be time to let it be absorbed and built on over years to see changes; • agencies with big responsibility to address CI are told not to do it (e.g DFG); • applaud DOT for having other agencies on their planning teams regarding projects, but there is not adequate funding for this, its like blood from a turnip • agree on a definition of "adverse" CI; • write out protocols to address them • provide adequate staffing to verify through monitoring whether existing controls are working • districts could look into protecting ocean/coastal bottom (i.e. dragging /fishing bottom scour) which dramatically changes things and washing up on shore; • elders are seeing marine organisms on the beaches that they've never seen before, the district needs to emphasize this problem - possible catastrophy could occur in the absence of regulatory authority; • ACMP should not be limited to inland waters, but consider coastal waters issues; • need a lot more interagency coordination on difficult projects; • can only do it if environmental people know what is going on early in planning stages; • not enough people, time (e.g.DOT has 2 regions that do engineering and project construction in the PWS area - have to get to know two offices/people in order to work with them); • state does woefully bad job of training people so train them to work with these issues; • find some dedicated funding to be able to address these problems; • project proponents should pay for the CI asessment work; • generally people know what they're trying to do but a matter of not being able to (lack of money); • now have impaired water bodies program for the big ones but not for others because spotlight is on the big ones with the press and public; • many small projects need to be addressed for Cis to be addressed overall; • the state always seems to need more information & studies, yet no action; • could move too quickly and cause damage [to current decision making processes]; • not much money to be thrown at these issues; so the approach should be pragmatic and easy to implement; • a "cautionary comment" re: a definition of CI - and trying to make it homogenous by compiling all jurisdictions; each agency has developed different definitions and should be allowed to do so; otherwise rename powers of each agency or people "buying into it"; it would be better to beef up each agency's definition and understanding of their definitions than to try to blend them all • no easy solution; • need all agencies, district, proponent to be part of process; • need some improvements; • those who make the rules should understand the real issues and be able to articulate and enforce them; • CI is an issue for state resources, it would be an impossible mess if individual communities were required to come up with

methods - just getting a CMP adopted is alot for a small community - too burdernsome to add CIs; • a standard approach would have to be adopted generally so it is consistent among communities, a huge task - it is not practical for communities to do it on their own • local knowledge should be considered more than it is; • local say should be weighed more heavily than other non-local people's say; • regions are so different and reviewers don't pay attention to what is best for local area's people; • local community should be given general guidelines for one thing; • let community determine what level of service/quality of life they want to maintain; • best decisions and expenditures are made locally.

Thank you very much for your time and contributions to this study.

We will write a report based on the interviews we are conducting. Are you interested in seeing a copy of the draft report? If so, it will be sent to you for your review and comment later this spring. _____Yes _____No

[If Yes] I'd like to confirm that we have the correct address for you [read the address on cover sheet and make any corrections].

Thanks again for your time.

Appendix D

Sites Where Cumulative Impacts are Occurring, As Observed by Survey Respondents

APPENDIX D
Sites Where Cumulative Impacts Are Occurring, As Observed By Survey Respondents

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
STATEWIDE SITES		
every small village and town in the state	village economies, quality of life, if we do something they can't afford to fix the problem, if we don't they get sick - regulatory compliance costs the community, costs of compliance w/ all water, air, solid waste costs is bankrupting communities	money costs for drinking water testing, air monitoring, solid waste tests, etc., etc.; fee based response, we go out, we find problems, we charge, but they can't pay
95% of all the small villages	inadequate, poor drinking water; solid waste disposal impossible, wastewater disposal impossible	tundra ponds make it impossible to site solid waste, drinking or wastewater facilities, communities lack tax base to do so
rural Alaska villages	environmental (WQ and land)	solid waste accumulation & improper management of solid wastes - not maintained, unsanitary, unregulated
village tank farms - Barrow, Nome; and other fuel storage like Eielson AFB and Fairbanks (refineries)	environmental, human health	fuel contamination
all transportation facilities like roads, highways, airports, ferry terminals, public buildings	environmental, social, economic, cultural	direct effect of removal/modifying the resource for the project; wetlands, rivers, fish and wildlife habitats; increased noise and congestion; increased access to new development; impacts to cultural or historical/archeological sites
list of impaired waterbodies (statewide list)	water quality	sewage, runoff, point source discharges over decades
placer mining sites	environmental	multiple mines on a stream add up over time to create impact to water quality/habitat
development in all larger communities (Juneau, Anchorage, Fairbanks, Ketchikan, Kenai Peninsula)	social economic impacts, local governments to expand services, natural wetlands and streams	growth in the state, limited land to develop = development concentrated in site specific, increase in road length = more wetlands filled, more stream crossings, more relocation - more roads, etc., etc.

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
state special areas (Critical Habitat Areas, game refuges)	environmental (fish streams - water levels for overwintering, spawning), wildlife overwintering	recreation, oil and gas, logging, timber sales, flying services, grazing activities
statewide	local users and existing lifestyles	tourism growth causing conflicts, impacts starting to add up
SOUTHEAST ALASKA SITES		
Hobart Bay (NE of Sitka) (several streams on 303D list)	water quality and fish habitat	logging and road building
Baranof Island (several watersheds, Nixon Creek, Rudman Creek, Starrigavin Creek, Akwasima Creek)	water quality and fish habitat	logging and road building
Kruzof Island (NW of Sitka)	water quality and fish habitat	logging and road building
Kuiu Island (Saginaw Creek and Security Creek)	water quality and fish habitat	logging and road building
Prince of Wales Island (Staney Creek, Harris River/Fubar Creek, Rio Beaver, Sligle Creek, Sal Creek, Cable Creek, 12 Mile Creek, 3 Mile, Dora Lake, # of Native Corporation sites)	water quality and fish habitat	logging and road building
Prince of Wales Island Forest Highway Improvements	old growth forest, fish streams, wetlands	economic development of mining, logging, etc.; access into new areas or improved access = CI and secondary
Skagway	erosion onto the roadway, slope degradation, boulders on the road, road to major tourist destination	crowded conditions, gravel extraction and road cut; mining activity of the hillside
Skagway	personal hazard, sewage and water connections	recreation vehicles, tenters on hillside
Mendenhall wetlands	water quality, environmental	sewage from residential development
City of Hoonah	subsistence - salmon streams, deer distribution, social/cultural economic impact to residents	logging on Sea Alaska lands will start up this year - taking place outside the city (but it does give economic benefit to the residents)
Monti Bay	scallops, subsistence use	human activity outfall from cold storage and sewage facility and marine traffic
Situk River	quality of experience for both commercial and sport fishermen	commercial and sport fishing and recreation and tourists
Lost River (Yakutat)	quality of experience for both commercial and sport fishermen, to a lesser degree in general and less on commercial fishing	commercial and sport fishing and recreation and tourists, to a lesser degree in general and less on commercial fishing

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Ankau (Yakutat)	subsistence use - recreation	sport fishing
Yakutat Area	visual experience, habitat, economy	logging
Thorne Bay	fish, marine environment	hydrogen sulfide accumulation, bark from log transfer facility/storage
Thorne Bay Harbor	fish	sort yard log transfer facility, sewer discharge, harbor, boat grid, cold storage permit - sited to cause least environmental impacts while also meeting economy consolidates impacts
Thorne Bay	water quality, bottom habitat	log transfer facility, community runoff, roads, boat harbor, bark deposition (hydrogen sulfide)
Thorne Bay	water quality and air quality	logs, pulp mill
Thorne River	fish habitat, visual aesthetics, fish stocks	increased use over time will probably experience bank erosion, outboard motor pollution, trash
Thorne Bay	aquatic life and habitat	nonpoint source pollution, development
Kake watershed, Gunnick Creek	floods, water turbidity	cumulative impact of logging sediment
Straits right out of town (a Southeast community)	clam subsistence	fish slurry (from processing), cold storage outfall
Kuiu Island	subsistence	logging, blowdowns
Port Camden	dog salmon subsistence	logging
Security Bay	salmon streams subsistence	logging sediment - lake has shrunk from 20-30 feet deep to now 10 feet
Comstock Road area of Haines	water quality in Sawmill Creek - fecal coliform bacteria in creek (anadromous waterway)	population growth & residential development with failing septic systems; fill, culverts, diversions, runoff into creek
Ketchikan Gateway Borough subdivision	water quality	ownership for wastewater treatment, sewage discharge unplanned development
Whipple Creek (Ketchikan)	drinking water	logging
Bear Valley (near Ketchikan)	not a nonattainment area but has problems they are monitoring	wood stoves
Ward Cove (Ketchikan)	water quality, crab fishery (personal use), fish habitat	sludge deposit, pulp mill (numerous discharges), seafood processor, air emissions, leachate
Ward Cove	water quality	mill, homes, putting runoff into the cove
Ward Cove	air quality	wood smoke in Bear Valley, from mill, # of wood stoves

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Ward Cove	environmental (water quality)	Ketchikan Pulp discharges organic material
Ward Cove	impaired waterbody	discharges (pulp mill and other industrial uses)
Ward Cove	extensive violation of water quality standards, dissolved oxygen, biological oxygen demand, dioxins	Ketchikan Pulp discharges organic material; organic mats form on bottom of cove
Ketchikan	water quality	waterfront activities
Tongass Narrows (near Ketchikan)	alluvial fan at mouth of salmon stream, kelp beds, fisheries migration and rearing, reduction of habitat	fill in the narrows because so much of the tidelands had been filled
Silver Bay (Sitka)	habitat, water quality for use by aquaculture farms; recreation	pulp company discharges
impaired waterbodies in the City and Borough of Juneau	water quality; fisheries resources	urban development, stormwater, encroachment into riparian areas
Juneau		Road
Juneau Airport	wetlands, anadromous fish streams	expansion fills, stormwater runoff
Juneau's downtown waterfront	land use (a resource limited in space); social resources	tourism - tremendous downtown impact mostly due to cruise ships
Gastineau Channel (Juneau)	water quality	cruise ships, marine facilities, discharge sites
Juneau	adverse economic effect (Kensington mine - increase demand for public services, mitigation required to fund a new school)	Kensington and AJ mines add to prior effects of Greens Creek mine (though that is now closed)
Mendenhall Valley	Air quality, non attainment area	residential growth, wood stoves, i.e. when all stoves added together = CI and road dust
Port of Juneau	visibility	marine vessels, cruise ships arrivals and departures = CI
Lemon Creek (Juneau)	not a nonattainment area but has problems they are monitoring	wood stoves
Auke Bay / Spuhn Island (Juneau)	local users	commercial operator wants to put in a kayak dock, if you allow it to go in, others impacted
Jordan Creek, Lemon Creek, Switzer Creek, Mendenhall River, Gastineau Channel (Juneau)	habitat loss, water quality, fish habitat loss	wetlands fills, urban runoff, failed septic, some seafood processors, outfalls, some industrial
Gold Creek (Juneau)	fish habitat (fish kill)	water appropriation

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Silver Bay (near Sitka)	hatchery, marine mammals, active community fishing use, had had seafood advisories, subsistence	pulp mill, road runoff, wood waste leachate, sludge deposit
logging in southeast Alaska	social and environmental	amount of timber harvest that industry wants verses competition for tourism, recreation uses,
25 streams in Southeast	salmon habitat loss (overwintering)	logging practices
SOUTHCENTRAL ALASKA SITES		
mouth of Deshka River	social and environmental	over use by the public
shore-based fisheries	social and environmental	amount of competition for sites for fishing/taking of fish is increasing
groundwater (along Hillside, from Rabbit Creek to Eagle River, even on the Kenai Peninsula)	drinking water, groundwater	onsite wastewater further downhill gets worse
Anchorage wetlands (Furrow Creek condo development east of New Seward Hwy, Tudor and C St.)	public use of wetlands, greenbelts and quiet places, habitat (wide variety), nesting and brood for water	continual loss of wetlands in the bowl, revisions in regulations decreases agency ability to protect, has allowed development to occur, not effective plan to coordinate.
freshwater wetlands in Anchorage Bowl (Klatt Bog, Connors Bog, Turnagain Bog)	wetlands	community expansion, regional commercial industry, roads/utilities, human use activity
all Anchorage Bowl stream corridors (Furrow Creek, Rabbit Creek, Little Campbell Creek, etc.)	riparian terrestrial habitat, water quality	community expansion, regional commercial industry, roads/utilities, human use activity
Chester Creek	aquatic and contact recreation	light industry, auto repair, landfill leachate, urban runoff
Chester Creek	riparian terrestrial habitat, water quality	community expansion, regional commercial industry, roads/utilities, human use activity, storm drain nonpoint source
Ship Creek	fish habitat	appropriation of water
Anchorage Bowl, Ship and Campbell Creeks		urbanization
303D List (Ship Creek from Davis Highway Down)	fish, aquatic life, recreation, drinking water	military (Army and Air Force), golf course, storm water, junk yards, ARCC = runoff
lower Ship Creek	riparian terrestrial habitat, water quality	community expansion, regional commercial industry, roads/utilities, human use activity
Campbell Creek (midreach)	aquatic and contact recreation	urban runoff, light industry, zoos and horses

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Chester Creek, Campbell Creek (Anchorage)	water quality	stormwater system, fecal coliform bacteria (from animals, humans), sediments, heavy metals
Dutch Harbor	environmental (water quality - fish processing wastes, fill, hydrocarbons)	filling of nearshore habitats, deposition of crab wastes on seafloor result in water quality problems and DO standards violated from increased level of BOD; nearshroe habitat impacted from fill for docks and support facilities; oily wastes from buried underground storage tanks and boat activity/bilge pumping
Beaver Inlet, Unalaska area	environmental (water quality)	seafood processing wastes accumulated on shoreline; numerous floating processors can go into areas like Beaver Inlet under a GP and discharge yet inlets lack adequate circulation to flush wastes
docks and fills, Unalaska	environmental (water quality and fish habitat)	fills and docks, especially bulkheads, can destroy intertidal habitats
south Unalaska Bay (Dutch Harbor)	nearshore marine environment & habitats; local beachcombers complained about waste on beach	seafood processing dischargers EPA issued permits w/ allocated shares for BOD & TMDLs
Dutch Harbor	harbor	seafood processing
shorelines to increase processing and developments	fish habitat	shore-based processors and floaters due bottomfishing increase = accumulation of waste
Unalaska Inner Harbor	loss of water quality & near shore habitat	harbor development, bulkheads, fish processing, sediment deposition from vessel washing
Unalaska	marine resources, crab, bottom fish, waterfowl, marine mammals	commercial fisheries in Bering Sea and North Pacific and pollution from cannery
Unalaska Bay	marine water quality	discharges from fishing vessels & fish processors
Iliuliuk Bay & Margaret Bay	loss of herring spawning, small subsistence fishery	
Akutan Harbor	one mile of biological resources now displaced , including 12-15 acres of shellfish beds, previously used for subsistence	processing plants, a new 800'-1000' sheetpile bulkhead
Akutan Harbor, King Cove Bay, Popof Strait	shore based processors	waste accumulation

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Akutan	marine resources, crab, bottom fish, waterfowl, marine mammals	commercial fisheries in Bering Sea and North Pacific and pollution from cannery
Atka	marine resources, crab, bottom fish, waterfowl, marine mammals	commercial fisheries in Bering Sea and North Pacific
Nikolski (Umnak Island, Aleutian Is.)	marine resources, crab, bottom fish, waterfowl, marine mammals	over harvest of Bering Sea fisheries
Adak (Aleutian Is.)	wetlands	landfill
Adak (Eskimo Creek)	water quality	septic and hydrocarbons
City of Dillingham (bluff and SE corner erosion - Nushigak Bay)	housing eroding into the river (150 feet of erosion), sewer line exposed	wave action (tides), wind, human activity (housing and sewer line)
Dillingham area	banks, streams, wetlands	docks and facilities change bank stabilization/erosion, road crossings from the new roads
Nushagak/Mulchatna River Drainages (N of Dillingham)	increased demand on resident and anadromous fisheries in these drainages, & on landscape and riparian areas	increased number of commercial/ recreational facilities on state and private lands, largely for sportfishing and ecotourism
mouth of the Stuyahok and Mulchatna Rivers (confluence)	Native Allotment and old village (historic site) quality of experience and conflicts between users	one of the most heavily used public used sites, float planes (air taxis)good fishing, beach for camping, standoffs over trespassing, litter, heavy local and subsistence use
Bethel Seawall	river channel is changing, more water in overflow meanders; subsistence use & transportation / access may change over time	scour might be due to bank hardening project or natural circumstances
City of Bethel	air quality, water quality in lakes and ponds	gravel roads and particulate from roads affecting surrounding village (health, quality of life, operation of equipment)
Goodnews Bay, Lower Kuskokwim		platinum occurs there/copper
Red Salmon mining site above Platinum (Kuskokwim Bay)	traditional fishing, trapping, camping on Salmon River	placer mining up to 1980s, disregard for current regulations
Cape Vancouver (Nelson Island, SW of Bethel))	effect on bird population	lots of lubricants discharged into marine waters, offshore fishing, cumulative impacts from activities in federal waters
Salmon River, S of Goodnews Bay, & Tuluksak River (8-10 miles), & Bear Creek	physical disruption of fisheries (river channels narrower and shorter - altered habitat). On Tuluksak, subsistence and commercial fishing	historic mining operations - floating bucket line dredges, since 1929-1979 on the Salmon, since 1926 on the Tuluksak;

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Tuluksak River headwaters	cultural impacts - traditional cemetery, hunting grounds; fish and wildlife destroyed for several miles, (large sociological effect -villagers have to go further to subsistence fish), cut off water supply, heavy metals in water, elders dying of cancer	Nyak Mining company placer operations since 1930s (prior to regulations)
Tikchik River (N of Dillingham)	vegetation damage at variety of areas along 60 miles of river, increased litter, and	increased use, funding
Koktui River, Pebble Copper deposit (Lake and Peninsula Borough)	Rainbow trout fishing	potential for largest open pit copper mining in North America, tailings - see Appendix of Lake & Penn public hearing draft
Agulapak River public camping at north end (Wood Tikchik)	vegetation damage, trails damage, and creation, fish stocks impacted	increased use adding over time
North End Agulapak River	quality of experience is changing	increased use
Nishlik Lake shoreline (SW of Sleetmute)	litter, vegetation damage, drain it	dramatize increased public use due to hunting pressure
increased competition at broad number of locations in Tikchik park	quality of experience, litter, vegetation damage	increased commercial use - guide operations
Port Graham (Nonwhaleek, English Bay)	cultural concerns and water quality	aquatic farming, logging (transfer facilities) conflict over water quality
Ayakulik River (S end of Kodiak Island)	major salmon habitat, kings, coho, reds; prime bear habitat; social impact from more people	major commercial seine fishery off mouth of river; floaters on river - sportfishing, wildlife viewing; "overflow" of fly-in sportfishermen as other areas become more crowded (King Salmon)
Anton-Larsen Bay (Kodiak)	fisheries	set net, commercial fishing, aquatic farming
Pillar Creek (Kodiak)	fish habitat	appropriation of water
Near Island Channel, Kodiak side	Near Island King Crab nursery area	expansion of small boat harbor, additional industry, float plane facility in near future
Kodiak	viewshed, water quality	logging, recreation development
Karluk River and Lake (Kodiak)	same as Ayakulik River	same as Ayakulik River
numerous Kodiak fishing areas accessible from road system	habitat destruction; competition amongst user groups	increased numbers of people; a church brings busloads of people 200 at a time

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Susitna River	fisheries	logging, recreation, urbanization
Little Susitna /Deshka /Yentna Rivers, etc.	environmental /socioeconomic	increased water traffic results in increased erosion of river banks and damage to fish and wildlife habitat, water quality and tourism; increased road traffic results in increased noise and disturbance and runoff; increased development changes habitat, drainage, groundwater; changes to economic, cultural aspects, quality of life
Anchorage area refuges (Cook Inlet, Susitna Flats State Game Refuge)	waterfowl (spring and fall staging areas) and nesting habitat	increased public use, unenforced land use activities (trespassing, cabins), illegal overland access to sites
six recreational rivers across Cook Inlet - Susitna, Talachulitna, others	user groups are affected no proof of habitat destruction	power boating & increased recreational pressures on rivers
Matanuska Valley Moose Range	moose habitat	timber harvest, grazing activity, support facilities, timber harvest not promoting browse as required.
Susitna Flats Refuge	fish streams, waterfowl, bears and moose	potential oil and gas, road development, duck shacks, sport fishing
Big Susitna/Matanuska Rivers	environmental/socioeconomic	river course changes naturally and affects development
core area between Palmer and Wasilla	socioeconomic	increase population results in increased crime and increased concern with safety
core area rivers	environmental/socioeconomic	erosion of rivers affects development and conversely development affects riverbed stability and habitat
Chitina / McCarthy area	groundwater, litter in heavily used areas	influx of people during summer - visitors, fishers without the infrastructure/ services for them
Cordova	infrastructure in Cordova	road, increased tourism, development, mining, oil, and timber
Whittier	Prince William Sound	access
Two Moon Bay, Irish Cove, etc. (Port Fidalgo, Prince William Sound)	fish and wildlife habitat, water quality, recreation and tourism biggest	year to year no problem - over a long time (10 years) CI - logging
Prince William Sound	water quality, fisheries	oil spill, commercial overfishing, logging, runoff from activities on uplands

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Site?	money for city (Not being able to operate container terminal)	over regulation, regulations imposed by feds make financial impact to city
Deep Creek	fisheries and wildlife	urbanization
Deep Creek at Seward Highway	fishery, quality of experience decreased to local residents	more and more people fishing there over time
all Kenai roadside streams (Deep Creek)	fisheries, wildlife, marine mammals, birds and their habitat	ecotourism, fishing, large numbers of people
Portage Creek (Turnagain Arm)	king salmon fishing	heavy use are for short duration
Glacier Creek (Near Girdwood)	contact recreation	despite NPDES permits (mixing zones) is causing impacts
Anchor River	fisheries and wildlife	logging in headwaters
Ninilchik	fisheries and wildlife	public use
Crescent River (near Tuxedni Bay)		primarily logging
Birch Creek	Drainages, vegetation, aquatic life, fish	placer mining by a bunch of individual placer operations past and present
Afognak Island	fish and wildlife habitat, water quality, less so on recreation or private land	year to year no problem - over a long time (10 years) CI - logging
Captains Bay (Unalaska Bay)	nearshore marine habitat, was used for subsistence gathering of mussels, clams	safe harbor, vessels were bilge pumping, ship washing and discharging effluents
MacNeil River	environmental, social, cultural	increased number of people attracted to view wildlife
Lake Iliamna (northern) and Lake Clark	environmental (fish and game)	getting close to threshold for subsistence and visitor industry/recreational hunting and fishing; guiding; economic activities may impact subsistence resources
Cook Inlet	fisheries resources	oil & gas development and exploration
Cook Inlet (lower Kenai Peninsula, inner and outer Kachemak Bay, upper Cook Inlet, Susitna Basin drainages)	subsistence use and the resources, salmon, marine mammals, bottom fish	Valdez oil spill, commercial harvest and competition for resources
Cook Inlet	economic	where oil and gas lease sales are stopped or delayed has an economic effect - no new discoveries
Cook Inlet mineral development		Red Mountain citronite, Johnson River gold, silver, zinc, Beluga coal
Kachemak Bay	water quality & fisheries	intensity of use - too many sites in one area; conflicts of users

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Resurrection Bay's east side - Thumb Cove, Humpy Cove	similar to Kachemak Bay	similar to Kachemak Bay
Kachemak Bay (Jakalof Bay, Kasitsna Bay, Peterson Bay, Halibut Cove)	Social/Biological impacts viewshed, lost crab fishery, clamming	high recreation density, increasing over time, fishing increase, camping/hiking areas
Kachemak Bay (critical habitat area)	water quality decreased, fish and shellfish could affect aquatic farms, human use of fish and shellfish	shoreline development, particularly on-site pipes into bay
Fox River Flats	wildlife habitat, recreation uses	grazing leases
Fox River Flats	grasses trampled and water fowl habitat decreased	grazing
Caribou Hills area	social, political effects on cabin users; increased pressure on trails, hunting, moose	state decision to authorize initial trespass cabins, then increase in use of trespass cabins by new users wanting to establish rights
Resurrection Bay (Thumb Cove and Humpy Cove)	recreationalists, social impact, cabin owners, anchorages	overcrowding of boating potential conflict with upland owner and crowing in cove or aquatic farm in cove
Funny River Bridge (over Kenai River)	Kenai River wetlands loss	increased residential development
Kenai Peninsula anadromous rivers: Kenai, Kasilof, Anchor Rivers	fisheries resources; social & economic impacts	conflicting uses 7 degradation of habitat, other complex issues
Kenai Peninsula salt water harbors: Mouth of Kenai River; Homer Small Boat Harbor; Seldovia Small Boat Harbor; Seward Harbor & coal facility	water quality	pollution from hydrocarbons & waste disposal coal loading
Kenai Peninsula	fisheries and wildlife and their habitat	logging, tourism, commercial fishing, recreational fishing (economies are driving it)
Kenai River	fisheries and wildlife and their habitat	development and recreational fishing
Kenai Peninsula/Kenai River	fisheries and wildlife	no planning, filling wetlands, stormwater use
Kenai River	fish habitat, recreational resources	fishermen / tourists trampling river banks
Kenai Peninsula	social, cultural, environmental	overfishing/too many people and lack of road to other areas to reduce impacts to this area
Kenai River	environmental - recreational, commercial, personal dipnet fisheries;	projects along the river

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Kenai Peninsula (Kenai River and other major salmon drainages, Anchor River, Deep Creek, Ninilchik)	fish activities, wildlife habitat that have a relationship to the streams, loss of vegetation	changes in land ownership - mixture, private ownership of corporation = decreased ability of state to provide habitat protection, private development activities (logging, road building, public access)
Kenai River	pressure on river banks, habitat	boat wake, recreational & commercial fishing
Kenai Fjords on Seward side	fisheries, wildlife, marine mammals, birds and their habitat	ecotourism, fishing, large numbers of people
Kenai Peninsula between Kasilof and Anchor River	Fish and wildlife habitat, recreation and tourism, water quality	logging = cuts in small batches from 40 acres to 30,000 over several owners' properties
Moose Pass, Kenai Lake, and Trail Lakes area	fish and wildlife aesthetics, recreation and tourism, water quality	nothing now but, plans coming to fruition for timber harvesting on state, federal, and private lane
Ninilchik drainage (SW of Kenai)	fishery in stream	logging, CIs are a matter of perception, some say very little impacts to stream but no one has specifics, and CIs don't really exist, they [agency] minimizes impacts first [before impacts occur]
NORTHERN ALASKA SITES		
Prudhoe Bay	air quality	NoX and black smoke particulates from gas flares, turbines, generators, industrial activity combined
Prudhoe Bay, oil and gas development	wetlands and lakes	initially - large pads, defense sites, road routes, debris, fuel spills, areas devegetation, barrels of contaminants
North Slope Prudhoe Bay development	coastal plain wetlands	gravel mining, road construction
North Slope	caribou (contested data), viewsheds	well densities will increase, infrastructure roads and pipelines, human activity, thinks they are close to threshold
Prudhoe Bay oil complex	environmental and cultural/economic (wildlife, subsistence, air and water quality, habitats)	roads, drilling pads, physical use of the land, noise, dust, aircraft and boat traffic
old exploratory sites	vegetation damage, some growing back	gravel pads
North Slope Oil Field	decreased tundra wetlands, habitats for waterfowl, caribou, etc.	gravel fill over 20 years, pads, roads

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
718th US Air Force ACNW site (Bering Straits region)	seepage into ocean; cancer rates are elevated and unexplained in the area	unknown (possibly due to hazardous waste dumpsite near ocean)
Cape Beaufort (Chukchi Sea), NW Arctic Coal	beluga migration	fuel spills
Beaufort Sea Natural Gas	beluga migration (timing would be important)	ice breaker natural gas tanker, no plans by state
Beaufort Sea	near-shore marine habitat	causeways, change temperature and salinity
Nuiqsit	environmental and economic/cultural (subsistence, human habitation, quality of life, air and water quality, visual, psychological)	noise and disruption of access/prevention of access; displacement from traditional hunting; air quality from industrial activities at Prudhoe Bay
Kaktovik	same as above	aircraft traffic (recreational, commercial, scientific, political); recreational use or rivers and impacts on traditional camps; removal of firewood; degradation of experience; scientific studies and "taking" of animals creates anxiety and conflict with traditional values and respect for resources;
Anaktuvuk Pass	same categories as above	commercial guiding activities generate air traffic, flightseeing, recreation hikers, sport hunters, and result in federal regulations and park designations limiting access and use of resources by all
all villages in northwest arctic	cultural lifestyle changes	economic activity, housing changes, water & sewer systems
Kotzebue	subsistence uses in area have declined, used to be very productive - Beluga whales, fish, geese have moved further away; herring fishery	population growth - from one horse town to 3500 people; operation of cannery effected this
Kotzebue area	negative impacts on culture and subsistence in villages due to economic disparities	Red Dog Mine Joint Venture - influx of economic activity, salaries and wages
Kotzebue and villages	subsistence village lifestyle changed by presence of tourists	tourism -outfitters, air taxis, guided recreational hunting, raft and canoe parties dropped off high up on the rivers
Kotzebue area (Kobuk River mining and development)	salmon fishery	Ambler copper belt, in the foreseeable future it will be developed

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Coastal Villages (Kotzebue, Nome mining)		small CIs - roads, housing, pads, spills, etc.
Moonlight Springs (Nome)	water supply for city of Nome - quantity & wellhead pressure has dropped, pH has risen	possibly mining within the recharge area (unsure) which is a designated "Watershed Area"
Nome open pit mine	air	diesel power and electric-generation
Nome area	crab fishery	several potential deposits in one area, ports, roads leitering
Snake River "Turning Basin" (Nome's safe harbor)	contaminated sediments in basin; current loss of economic value as harbor cannot be developed (dredged), so access to commercial fishing is limited	possibly natural levels of metals in Nome area geology, possibly mining upstream (unsure) shoreline crowded with small boats
Red Dog Mine	air, water, visual, social and economic	runoff, tailings, impoundment, hole in the ground which will be a lake, road, hauling, concentrated (zinc, lead), fuel storage and shipment, blasting, acid mine drainage into river. Mine created jobs but some are not happy with the mine - threat to subsistence
Red Dog (Kivalina Port Site)	Beluga migration and water quality	freighters going in and out, transportation corridor (road), loading facilities
Seward Peninsula	rivers (turbidity, arsenic), habitat has created moose habitat and benefit	placer mining over 95 years w/ reclamation still fairly new and benefit resulted in Nome
Seward Peninsula	year by year, lose a bit of the stream; loss of rearing capacity of streams, meanders, dolly warden and coho	placer mining, stream vehicle travel, ruts in the streams, channelizes streams
Bering Straits villages	nearby waters, lands oiled birds, seals	small fuel spills over time from fuel tanks, outboards, 4-wheelers; source of oil unknown
Kivalina and Shishmaref	solid waste (plastic), demand for water and wastewater, water shortages	mining, money coming in, TV - causes consumption, birth rates, physical limits, soils not conducive to the development
Gambell	petroleum contamination	fuel storage
Lower Chena River (Badger Slough, Chena Slough)	channelization, spawning and rearing habitat	urban encroachment, private land owner culverts, water impoundment and septic systems
Upper Chena River in recreation area	recreational use, arctic greyling fisheries, chinook run	road construction led to channel length removed

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
Dalton Highway	social, environmental	need infrastructure in place to avoid impacts
North Slope (Hickel Hwy, Tundra Route)	vegetation, scarred tundra, deep furrows got wet and now green, distinctive noticeable impact	sleds (1960s) hauled by tracker cat caused deep furrows over time
material sources on Richardson Highway	economic	resources mined out so not available for construction thereby increasing costs because materials have to be imported from long distance
along all Road Systems (Denali Hwy, Steese Hwy, Elliot Hwy)	fish rearing habitat	culvert installation (undersized pipes = perched pipes cuts off running habitat and aquatic habitat
past State land disposal (a number around the interior like Kokomo Creek on the Steese Hwy)	the land itself, timber to environmental pollution	settlement is haphazard, trash
Denali National Park	economic, social, not sure whether environmental	too many people and activities attracting them to one place; not enough infrastructure to allow everyone to use park; crowding
Denali	streams	mining at the Valdez Creek mine
Interior	Most CI has occurred because it is site specific and limited in close proximity	
Harding Lake (near junction of Salcha, Tanana Rivers)	land erodes into lake	residential cabins recreation, small lot development
Nenana River Canyon	bears	employees living and camping, not caching food
Timber Creek area (Koyuk River)	trapping, hunting	consumptive uses in the area by cabin users with state permits
Iditarod trail	various	traffic of dog teams & increasing amount of support activities
White Alice Twin Radar Site near North River	contamination - North river flows to the Unalakleet River & Little North River	hazardous dumpsite
Project Chariot site (NW arctic)	hunted and fished resources	fish, birds may be contaminated as they pass by the site on their way N and S then pass by villages
South Cushman Street Industrial Areas (Fairbanks)	environmental (groundwater, surface water, wells)	industrial shops use leaching pits for wastewater disposal and adding up over time; wells contaminated by metals, hydrocarbons

Site or Area	Resources or Uses Affected	Cause(s) of Cumulative Impact
City of Fairbanks storm drains and collection points discharge into Tanana and Chena Rivers	environmental (water quality)	non-point source from snowmelt, snowpiles an hydrocarbon runoff
Fort Knox Gold (Fairbanks)	environmental	mineral extraction verses environmental protection
Fairbanks - North Pole	wetlands annual flooding sewage backs up -	housing urban development/growth over time
Fairbanks AMATS	air quality	development contributing to decreasing air quality
City of Fairbanks proper	air quality and increased CO	mobile emissions from cold-starts